Scaling Strategy for Smallholder Regenerative Agriculture 2023-24

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 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 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/

Executive Summary

This report 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.

The focus here is on the smallholder farmers, and the central role they play in scaling the potential that regenerative agriculture holds.

Discussions about scaling regenerative agriculture (RA) globally often tend to imply that such scaling, to be effective, must inevitably focus on large-scale, commercial, mostly monoculture farming. We want to posit, however, that such an approach is neither inevitable nor desirable; in fact, it risks the integrity of regenerative agriculture altogether. It might spread wide, but not go deep — 'deep' in the sense of truly regenerating ecosystems, communities, and farmers' lives and livelihoods. (The principles of such deep regeneration were discussed in the first report in this series, *Regeneration and Regenerative Agriculture: Definitions, principles and practices*.)

If regenerative agriculture is going to scale, it needs to foreground the pivotal role that the smallholder farmer plays. There are an estimated 600 million smallholder farming families in the world, each farming on two hectares or less, and together they grow an estimated one third of the global food supply. We rely on them for our food security and for critical care and stewardship of farming landscapes. It is with them, and with the plots of land that they manage, that there is a true opportunity for regenerative agriculture to go deeper and — if they are engaged and supported appropriately — widely. Once regeneration benefits and enlivens one group of farmers, it can spread effectively and widely through farmer-to-farmer exchanges, networks, and collaborative learning.

This report, then, focuses on scaling regenerative agriculture in a way that foregrounds

- **Smallholder farmers**
- **Food sovereignty and land sovereignty**
- **Traditional and indigenous ecological knowledge**

Regenerative agriculture itself is rooted in agroecological traditions that have been practiced by smallholder and indigenous farmer communities for centuries. It is therefore pivotal 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.

While centering the smallholder farmer, it is also important to highlight the three different kinds of economic models and markets they interact with: export commodity crops, crops targeting local markets, and subsistence crops. Scaling looks different for each of these models, and each of them have their role in creating ecological diversity and economic resilience.

Smallholder farmers around the world may grow crops or manage livestock for commodity export markets, for local markets, or for subsistence. Smallholder-centered and export-driven modes of agriculture are therefore not mutually exclusive. Regenerative agriculture may in fact be able to build bridges between export-driven farming on the one hand, and local markets oriented or subsistence farming, on the other.

As we raise the question of what scaling regenerative agriculture would look like across four vast regions, we have to ask the question: scaling in what sense?

'Scaling' is conventionally used in the sense of replicating, such that more value is generated while investing more or less the same amount of energy or capital as before. Therefore, scaling regenerative agriculture is usually understood to mean simply taking a given set of regenerative farming practices and applying them on ever-larger acreages.

But scaling in the sense of mechanical replication, or applying a one-size-fits-all template to diverse circumstances, is unlikely to be successful with regenerative agriculture initiatives. Regenerative agriculture is always and by definition context-specific; it is emerging from or tailored to a particular place, with its unique climate, soils, constellation of crops, and community. (See the first report in this series, *Regeneration and Regenerative Agriculture: Definitions, principles and practices*.)

In this report, "scaling" refers instead to different modes of widening the reach of regenerative agriculture and supply. We may speak of extending, expanding, and evolving regenerative agriculture.

Extend: Transitioning more farmers and hectares to regenerative agriculture

Extending may look like growing current production volumes and numbers of participating farmers in regenerative agriculture pilots. To take an example, in the case of the Wanakaset rubber project in Thailand discussed later in this report, the 'extending' type of growth might look like increasing the volumes of regenerative rubber and perhaps reaching saturation within the existing market (rubber for footwear).

Expand: New crops or products including secondary crops

Another type of growth might look like identifying entirely new, higher-value markets or new uses for the same crop — for example, new markets for rubber (beyond footwear), value-adding, or identifying markets for new crops that have not yet been commercialized.

Evolve: What economic value can be generated besides through crops

There is yet a third way in which scaling can occur: through entirely new forms of value offering systems that emerge in alignment with industry evolution. Rather than scaling in the sense of replicating, it is scaling that accommodates and builds on the distinctiveness and uniqueness of each place or business. In the case of the Wanakaset rubber project, this could look like data as a farm product; forms of agritourism and hospitality; the embracing of indigenous or local Thai-based microeconomics; or a new, distinctly modern but place-sourced and tradition-sourced way of life rooted in place.

This report briefly introduces the focal geographic regions, key considerations and challenges with regenerative agriculture adoption in those regions, and most effective interventions for 2023-24 to support smallholder farmers in transitioning to regenerative agriculture systems. We do so holding these three modes of growth or scaling in mind, even when we don't explicitly reference them.

Scaling Strategy for Smallholder Regenerative Agriculture:
Sub-Saharan Africa

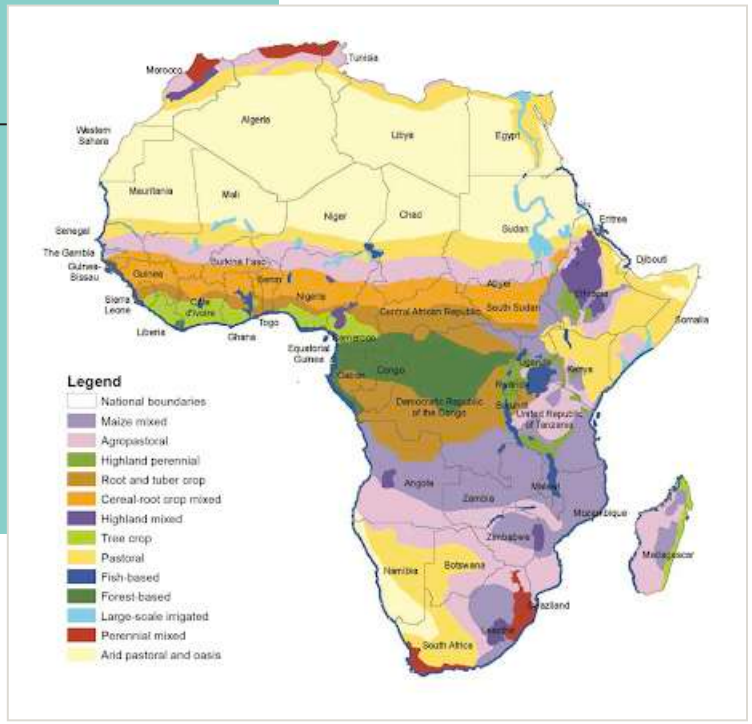
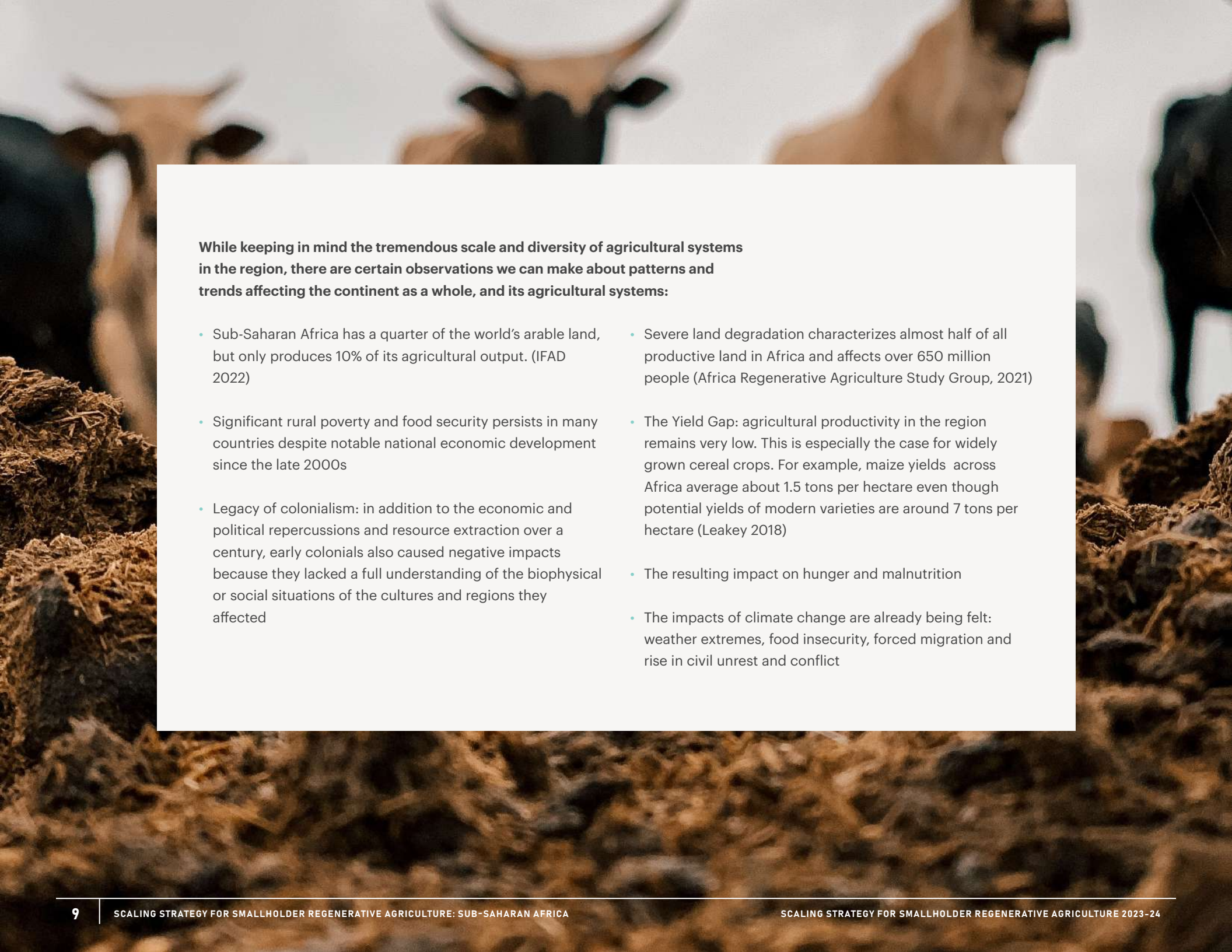


Image: Dixon et al. 2019

INTRODUCTION TO THE REGION

There is no one story of agriculture in Africa. African farming systems are highly diverse and heterogeneous, shaped by soils, climate, plant and animal species, transport routes and markets, culture, and history. The above map demonstrates that, even at a very high level, we can identify 13 distinct farming systems in Sub-Saharan Africa, and these can look quite radically different from one another. Consider the diversity of "highly productive banana-maize-coffee systems in the East African highlands, cereal-root crop-livestock systems in western Africa, artisanal fisheries off coastal Mozambique, nomadic pastoralism, and urban agriculture in many parts of Africa." (Dixon et al. 2019, 11)

The majority of farmers in Sub-Saharan Africa are smallholder farmers, meaning that they farm on less than 2 hectares. Traditional or indigenous African farming techniques include mixed cropping, intercropping, various forms of fallowing, crop rotations, no-tillage or minimal tillage and various forms of agroforestry.



While keeping in mind the tremendous scale and diversity of agricultural systems in the region, there are certain observations we can make about patterns and trends affecting the continent as a whole, and its agricultural systems:

- Sub-Saharan Africa has a quarter of the world's arable land, but only produces 10% of its agricultural output. (IFAD 2022)
- Significant rural poverty and food security persists in many countries despite notable national economic development since the late 2000s
- Legacy of colonialism: in addition to the economic and political repercussions and resource extraction over a century, early colonials also caused negative impacts because they lacked a full understanding of the biophysical or social situations of the cultures and regions they affected
- Severe land degradation characterizes almost half of all productive land in Africa and affects over 650 million people (Africa Regenerative Agriculture Study Group, 2021)
- The Yield Gap: agricultural productivity in the region remains very low. This is especially the case for widely grown cereal crops. For example, maize yields across Africa average about 1.5 tons per hectare even though potential yields of modern varieties are around 7 tons per hectare (Leakey 2018)
- The resulting impact on hunger and malnutrition
- The impacts of climate change are already being felt: weather extremes, food insecurity, forced migration and rise in civil unrest and conflict

Some of these crises are part of the legacy of the Green Revolution. The Green Revolution aimed to resolve the global food crisis by increasing the productivity of conventional, high-input agriculture of monocrop cultivation of staples that were mostly foreign to Africa, and crop breeding. While it saved millions of people from starvation, it came at a high cost of accelerated deforestation, land degradation, and extractive use of natural resources.

As Roger Leakey points out,

> **"Underlying these crises is the situation that global policies are developed in industrialized countries with inadequate recognition that farming systems are very different in other parts of the world. For example, in industrialized economies, large capital-intensive farms are managed by around 1%–4% of the population; in non-industrialized economies, farmers making up around 40%–60% of the population often live on the brink of the cash economy. Typically, these farmers live on fragmented smallholdings totalling about 2 ha [...]. Significantly, these smallholders lack access to the Green Revolution technologies."**
>
> (LEAKEY 2018)

It is illuminating to contrast the Green Revolution in Asia and in Africa. The Asian Green Revolution built on a stronger foundation of prior agricultural research; it spread in irrigated areas, and had strong market and policy support. Therefore, it was in many ways a success story in Asia. Major adaptations would have been needed for the Green Revolution to truly work in Africa, with its typically rainfed farming, volatile climate, sparse infrastructure, weak institutions and markets, and huge complexity and uncertainty (AGRA, 2021). The Green Revolution operated on the assumption that smallholder farmers would be able to purchase the necessary technical and chemical inputs. This has not been realistic in Africa, where millions of farmers live on the brink of the cash economy. As a result, soils have become degraded and infertile, trapping millions of smallholder farmer families in a cycle of hunger and poverty.

Trees, in the Green Revolution mentality, "were considered a hindrance to be removed," as Leakey states. The proponents of the Green Revolution failed to recognize the multiple ecosystem services and benefits of trees: the fact that they retain and build soil health of fragile soils; they control to the biocontrol of pests and diseases, and they are the source of culturally important traditional food and non-food products (Leakey 2018). The resulting deforestation across the continent has had devastating effects on soil and ecosystem health, livelihoods, and food security.

THE POTENTIAL OF REGENERATIVE AGRICULTURE IN SUB-SAHARAN AFRICA

In the last decade, as regenerative agriculture has emerged as part of the vocabulary in international development, investment, and business, the question has arisen whether and how regenerative agriculture could play a role in resolving the intersecting challenges of land degradation, the Yield Gap, food insecurity, and climate change in Sub-Saharan Africa, specifically.

A 2021 report demonstrates that practices typical of regenerative agriculture, such as crop diversification, tree planting, reduced tillage, mulching, and water conservation techniques, could meaningfully contribute to addressing the land degradation that is at the root of many of the continent's wicked problems (Africa Regenerative Agriculture Study Group, 2021). Drawing on studies analyzing the impacts of eight existing regenerative agriculture projects in Africa — ranging from Farmer Managed Natural Regeneration (FMNR) to agroforestry and "Climate-Smart Farming" — the report observes that all of these projects show a considerable increase in crop yields. Not only do regenerative farming systems greatly increase yields, they also reduce input costs for farmers.

> **"The annual savings to farmers across SSA [Sub-Saharan Africa] may be as high as USD 17 billion by 2040. Increased uptake of regenerative agriculture in Africa could support nearly 5 million jobs by 2040 in addition to increasing revenue and food security for smallholder farmers. Farmers adopting regenerative agriculture can benefit from higher and diversified revenue streams, and may generate additional financial capital that can be reinvested at farm level or help respond to external shocks."**
>
> (AFRICA REGENERATIVE AGRICULTURE STUDY GROUP, 2021, 6)

There are a few examples of large corporations that have already implemented regenerative techniques in their supply chains, focused on export products, and are seeing promising yield increases as well as socio-economic benefits for farmers.

- LEAF Africa, for example, is developing a number of demonstration farms in Kenya, where they model agroforestry techniques such as intercropping for tomato, maize and potato; incorporation of high-value fruit and timber trees, and the combination of pasture, animals, tree cover and diversified forests.
- Nespresso is working with coffee farmers in Ethiopia promoting the planting of native trees on coffee farms, as well as mulching, pruning, and managing pests with low-cost, locally available materials. The coffee farmers are seeing up to 300% yield increases.
- Olam is training cotton farmers in Côte d'Ivoire to use mulching and crop rotation to improve their soil health, and has seen an 80% increase in cotton lint yields. (Ibid.)

A number of organizations from different sectors are engaged in efforts that integrate regenerative agriculture practices or approaches, especially agroforestry.

- The Global Evergreening Alliance's Restore Africa Program
- The World Agroforestry Centre
- AFR100 (the African Forest Landscape Restoration Initiative) is an effort to bring 100 million hectares of land in Africa into restoration by 2030, a partnership of 31 African governments and numerous technical and financial partners. It aims to accelerate restoration to enhance food security, increase climate change resilience and mitigation, and combat rural poverty.
- Regreening Africa: an ambitious programme running from 2017-2023 that aims to reverse land degradation on 1 million hectares across 8 countries in sub-Saharan Africa. Regreening Africa integrates trees into crop and communal areas along with complementary restoration practices and approaches to enhance inclusion, value chains, policy, and local governance.
- Trees for a Future
- Holistic Management and the Savory Institute has been active in parts of Sub-Saharan Africa, regenerating grasslands through livestock management
- New CGIAR research flagship program "Forests, Trees and Agroforestry: Livelihoods, Landscapes and Governance" is working on tree genetics and how it can improve the livelihoods of smallholders.
- Agroforestry Alliance for Africa, made up of a number of NGOs, is engaged in rural development programs in Africa
- International Tree Foundation is funding small-scale tree planting projects at villages in 8 African countries

To sum up: regenerative agriculture holds the promise of diverse benefits for Sub-Saharan Africa: significant increase in crop yields, adaptability to varying climate and extreme weather, reduction of climate and supply risk, improved income and livelihood opportunities, and contribution to community cohesion and gender equity. A number of organizations are already engaging in promoting regenerative agriculture practices in the region. **But what is still needed is a viable scaling pathway or roadmap that takes into account the unique localized contexts and challenges of the countries and farming systems of Sub-Saharan Africa.**

CHALLENGES TO SCALING

If the benefits of regenerative agriculture across sub-Saharan Africa are so evident, why haven't they already been implemented at a wide scale?

Some of the barriers to the adoption of regenerative agriculture are common across continents, such as farmers' lack of access to capital to cover the initial costs of implementation, or the time delay before investments begin to show returns, especially in building soil health and implementing agroforestry systems. But there are a few circumstances and trends that uniquely characterize the regions of Sub-Saharan Africa. Here are 5 of them.

Complex bureaucracy and unsupportive policy. Patrick Worms of the World Agroforestry Center illustrates what he calls the "baroque growth of bureaucracy" in West Africa by telling the story of a farmer in Senegal who was practicing Farmer-Managed Natural Regeneration. In order for the farmer to cut a single tree on his land, he needed to collect the signatures of three representatives of different state and local agencies, some of whom were as far as 50 kilometers away. Even after he had collected the signatures, he had to wait for yet another official to arrive to observe him cutting the tree, and he would have to pay for the fuel in the observing official's motorcycle in order for him to come. These kinds of administrative and bureaucratic hurdles are one of main constraints that discourage people from implementing agroforestry practices. In general, agricultural policy is weakened by the fact that, as Worms says, "most people that can make decisions about agriculture live in cities, they didn't grow up on farms" and are not in a position to put themselves in farmers' shoes. (Worms 2022b)

Complex land tenure systems. In many Sub-Saharan countries, land tenure systems are complex, combining community customary rights and individual legal rights (Leakey, 2014). In Ghana, for example, there are about 100 different ethnic groups, and all have a different land tenure system. These diverse and inconsistent governance systems can be a major hurdle to scaling agroforestry, especially in West Africa. Having said that, Leakey adds, sometimes land tenure issues are raised as a problem by villagers if they don't want to engage in a project. If there's sufficient incentive and buy-in, people are able to work around questions of land tenure.

Sometimes cultural patterns such as land-sharing with herders comes into play. In Mali, for example, herders have legal access to the farmers' land for 6 months during the dry season, as dictated by communal law. Only during the wet season, when they are growing their crops, do the farmers have full decision-making power over how their lands are managed.

- **Land grabbing.**
This happens in a number of countries in Sub-Saharan Africa, both by foreign governments and domestic entities. People with enough capital can appropriate land and drive villagers off their own land (Worms 2022b).

- **Deforestation has ironically created a system in which it is challenging to invest in tree systems.**
Agroforestry systems are disincentivized by the fact that "government attempts to regulate logging and deforestation make the sale of tree products illegal." (Leakey, 2014)

Most farmers understand that trees make the system healthier. But they are disincentivized to plant trees because they may be illegally cut down by someone else, because the sale of tree products is difficult due to policy; or they don't prune existing trees because the ownership of trees is often unclear.

- **Lack of developed infrastructure and markets.**
Much of rural Africa is not on the electric grid. As a result, people use biomass for cooking/energy, which again causes deforestation. A large number of farmers live more than 2 hours away from the nearest market town and have difficulty selling their products; the distance also means limited access to agricultural services (Dixon et al. 2019, 53).

PROPOSAL FOR SCALING PATHWAY

Any meaningful proposal for a path forward must take the above unique constraints into account, and work with them.

Drawing on both research and interviews among experts on agroforestry and agroecology, the following discussion proposes seven interventions that can pave the way for supporting the transition to regenerative agriculture among smallholder farmers in Sub-Saharan Africa.

African ownership of and African leadership in any such initiatives is vital.

Rebuilding soil health by farmer capacity-building and tree nursery establishment to support the incorporation of nitrogen-fixing trees and shrubs.

The degraded, infertile farm soils across much of the region require immediate action. Remedying them through low-cost, low-tech methods, such as planting nitrogen-fixing shrubs and trees, will start the positive feedback loop of restoring soil fertility and ecosystem function. Mulches and manure can also be used.

Roger Leakey, who has extensive experience both on-the-ground and researching African tree crops, has laid out a compelling proposal for addressing the hunger and poverty on the continent. Rebuilding soil fertility is foundational to that strategy, as soil infertility is the root cause of what he calls the downward-spiraling cycle of land degradation and social deprivation. The three-step solution

> "includes **the restoration of soil fertility and ecological functions,** as well as the **cultivation, domestication and commercialization of traditionally-important, highly nutritious, indigenous food products for income generation** and business development. **A participatory approach involving capacity building at the community-level,** leads to the development of 'socially modified crops' which deliver multiple environmental, social and economic benefits, suggesting that increased agricultural production does not have to be detrimental to biodiversity, to agroecological function, and/or to climate change."
>
> (LEAKEY 2018)

The two other components of Leakey's proposal — domestication of indigenous food crops and development of participatory capacity-building approaches — are also included among the steps on the pathway to scaling below.

A multi-sector coalition to create supportive policy environments and remove administrative hurdles that disincentivize beneficial practices such as tree planting and agroforestry farming.

As discussed above, levels of bureaucracy that were initially intended to stop deforestation are now discouraging farmers from planting trees and caring for them. The organizations and initiatives listed in the "Potential of Regenerative Agriculture" section above would be well-positioned to consult on and lead such an initiative.

Collaborative sourcing

Companies and brands can support the development of diverse agroecological landscapes by investing in so-called collaborative sourcing, or landscape sourcing. This is a model in which off-takers from different industry sectors purchase crops from a particular farmers' group or area that is transitioning to regenerative farming. "Landscape sourcing involves cooperation within and across value chains to provide a package of economic, agronomic and social support to enable farmers in a specific area to transition to a regenerative system" (SMI Agribusiness Task Force 2022, 13). This has the benefit of lowering the investment for each of the off-takers by spreading costs. Farmers will be incentivized to incorporate multiple crops and operations within the farm landscapes, as opposed to monoculture farming, if they have secured buyers for all these distinct crops.

Income generation with new cash crops: Domesticating indigenous food crops & integrating them into cropping systems

Understanding the details and diversity of farmers' needs and aspirations — and developing programs to meet those needs, not the other way around — may involve the radical act of asking farmers what they want to grow when designing and co-developing regenerative farming or agroforestry projects.

Leakey recounts a story from Cameroon:

> **"When farmers in Cameroon were asked what they would like to be able to grow to generate income the response was unexpected [...]. Overwhelmingly, they said that they would like to cultivate the indigenous tree species that produce the traditionally- and culturally-important food and non-food products that local communities used to gather from natural forests and woodlands when they existed close-by."**
>
> (LEAKEY 2018)

That moment has sparked an award-winning (UN Equator Prize in 2010; National Geographic/Buffett Award in 2012; World Future Council in 2019) multidisciplinary initiative in Africa that studies the appropriate domestication techniques and skills of indigenous food and non-food species. There are tens of thousands of such useful species around the world, many of which could be domesticated, cultivated, and commercialized. For Africa alone, multi-disciplinary research has been carried out on over 59 species. Such plants include the mighty baobab tree, the South African marula tree with nutritious fruit, and the *eru* vine (*Gnetum africanum*) — a very nutritious leafy vegetable, rich in protein, essential amino acids and minerals, especially iron.

Although they may sometimes be labeled as "famine foods," in communities with strong ethnobotanical knowledge they carry no such stigma, and are broadly recognized as being excellent diet-fortifying foods. Farmers could be supported in cultivating indigenous trees that are known for producing useful food and non-food products. An additional strategy, described next, is building farmer capacity to manage tree nurseries and market their products.

It is important to note that commercialization of such indigenous food crops raises issues about the protection of intellectual and biological property, which need to be addressed. At the moment, there is no intellectual mechanism to support property rights for farmers who cannot afford it, although important work is starting to be done in this area (Santilli 2011).

Agricultural innovation hubs/ Participatory programs

The social dimension of scaling regenerative agriculture also needs to be addressed. Especially given the rarity of access to good technical support in rural areas, participatory networks such as Rural Resource Centres (RRCs) or grassroots, farmer-centered hubs are enormously important. 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)

Building Trust

In communities caught in a chronic cycle of poverty, trust can be eroded. In Zambia, in a holistic management project that aggregated many villagers' livestock to allow for rotational, managed grazing, trust was initially a key issue. People were afraid of letting their cows out of sight, even as grass was plentiful elsewhere, for fear that they might get stolen.

> **This has huge costs: the cows are not feeding properly, stay thin, and need frequent dipping against the heavy disease load their sedentary lives expose them to. Their manure is wasted and a lot of grass remains ungrazed, becoming a risk for dry-season fires. Every household has to allocate the labour of one child or youth to watch over one or two animals; labour that could be deployed more productively, whether in schooling or other work.**
>
> (WORMS, 2022)

It took 3 years to get everyone to start trusting each other, says Patrick Worms, who documented the project. After the initial 3 years, the project has gotten underway and been highly successful: an abundance of tall grasses and other plants are now shooting up from formerly bare, capped soil, and livestock are healthier.

> **"Trust comes from a lot of community work. When it's finally there, the results are almost miraculous," said Kalunde Mulenga, who works with Shenton at Mpanshya. "People could soon see that their cows were doing much better, growing fatter and being exposed to less disease. For many, the penny dropped once they saw the impact on their crops of the night kraaling of the communal herd on their fields."**
>
> (WORMS, 2022)

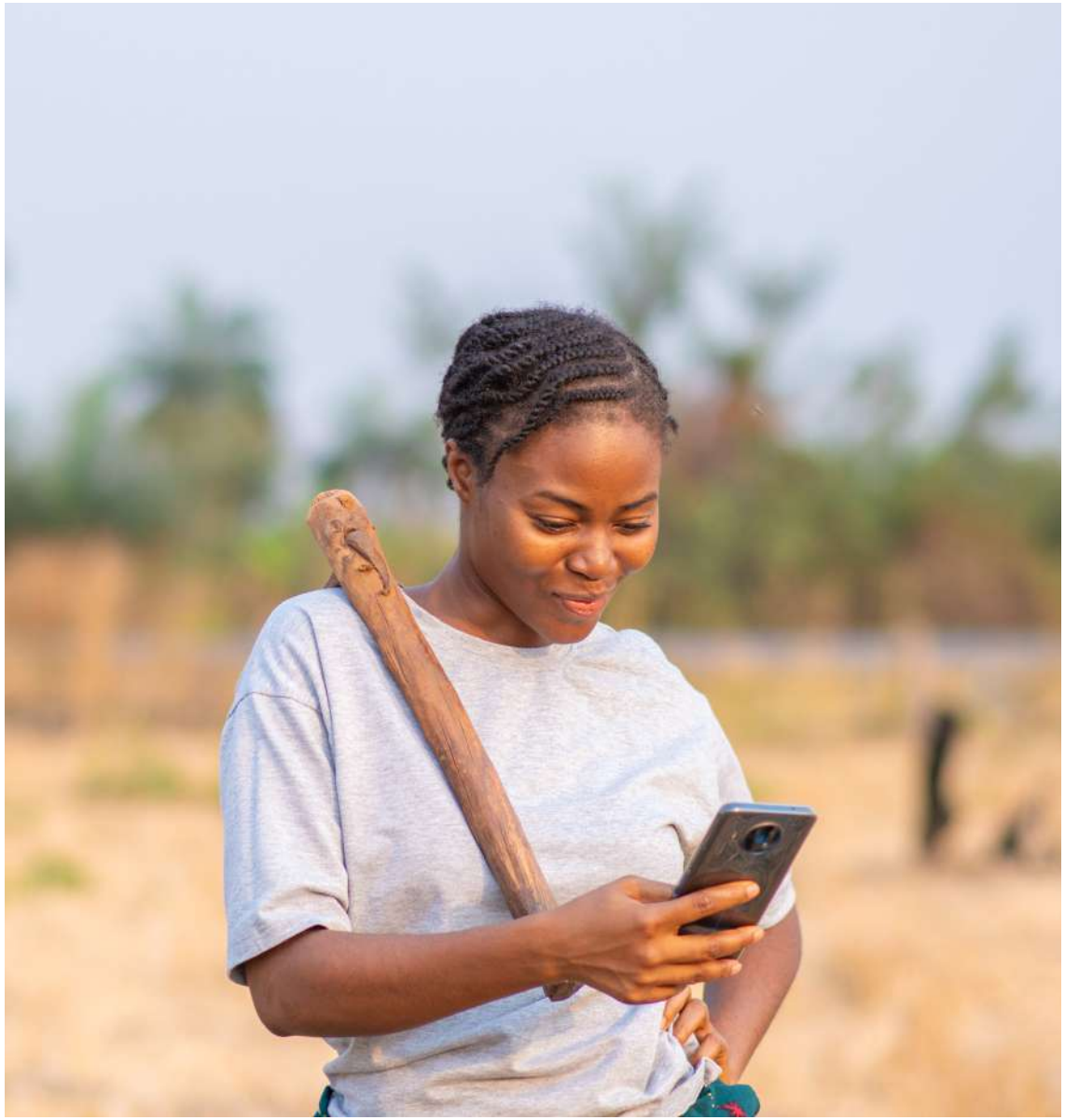
Reaching success with agroforestry projects is 100% about buy-in among the farmers. Farmers have to trust the partner or program they are engaging in. Building that trust can take a year of more. Time is also necessary for understanding the unique situation each farmer is in: they are different distances from markets, have different family sizes, different access to vehicles, and so on. Once you have a group of farmers excited, they can organize farmer-to-farmer sharing, spread their learning to neighboring villages, and so on. Youth in the area can get excited because they can now see a future for themselves in the rural area.

Supporting Farmers through Digital Technology and Rewarding Them for Their Data

Given the undeveloped infrastructure and distance to market towns in many parts of the continent, access to extension service support is rare. Digital technology — in the form of a simple mobile app — could improve access to real-time information on factors that affect farm outputs, such as temperature, rainfall, pests and diseases. Malik Dasoo recounts how in February 2020, a swarm of locusts devastates farms in the Horn of Africa.

> **"There was no early warning system. The locusts came after sporadic drought and rain, their appearance stunning officials from the Uganda National Meteorological Authority.**
>
> **Fast forward to early February 2022, and an AI company called Atmo AI sent a beta version of its supercomputer to Uganda. It offered weather forecasting services at a fraction of the cost of traditional supercomputers and data centres typically needed to make weather forecasts. This digital innovation ensured that farmers will be prepared for weather-related threats, including the pests that in the past seemingly appeared out of nowhere."**
>
> (DASOO, 2022)

A simple mobile app could also be used to access modular education materials on regenerative farming practices such as managing a livestock rotation, cover cropping, or using mulches and manure; or farm business management trainings.



Scaling Strategy for Smallholder Regenerative Agriculture:
The Caribbean

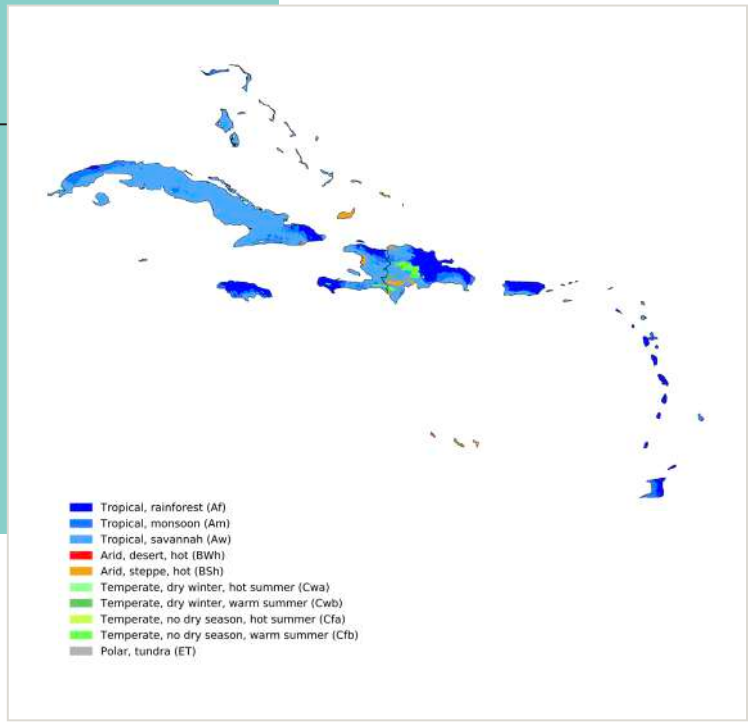


Image: Beck et al. 2018

INTRODUCTION TO THE REGION

For the development of an understanding about the Caribbean, and the challenges and opportunities around growing and scaling regenerative agriculture, this section — in part — draws on the insights gleaned from the Terra Genesis - Smallholder Farmer Alliance - VF Corporation - SDS collaboration around the development of a Regenerative Cotton Origin in Haiti. This multi-year, multi-stakeholder project builds on a significant history of working with smallholder farmers in an incredibly tough context.

As such, it provides us with many valuable ecological, socio-cultural, and economic insights that help inform the bigger picture at hand. Building off the Haiti Cotton case study are various reports compiled by the FAO, the Mustardseed Trust, and other organizations that have taken stock of the state of affairs in the region in relation to agriculture, ecology, economic development, and the continuous dynamic evolution of the socio-political landscape.

INTRODUCTION TO THE REGION

The Caribbean region covers the geographical space between the southeast of the United States, the eastern flank of Central America, and the north to northeastern expanses of South America. It is an area composed of many large and small islands, such as the Bahamas, Cuba, Jamaica, Hispaniola, Puerto Rico, Aruba, Bonaire, Curacao, and many others. Depending on definitions of what constitutes the region, in total, there are 13 independent countries and 15 dependencies that together share tremendously diverse cultural historic backgrounds, languages, and geographies.

QUICK FACT SHEET:

The inhabitants of the Caribbean are a mix of people of indigenous, African, European and Asian descent

The total population of the Caribbean is close to 44 million

Languages spoken in the Caribbean include English, French, Dutch, Spanish, and dialects of Creole, which combine elements of European and African languages

Major aspects of the economy are mineral mining, oil and gas, fisheries, agriculture, timber, and tourism

The definition taken in the discussion of this section limits itself to the islands of the Caribbean only. In some definitions the coastal regions along the Caribbean Sea are included as well, comprising parts of Central America as well as the northern coast of South America.

Geophysically, the Caribbean is characterized by a series of islands, some of which have dramatic variations in altitude and topography. These give rise to a variety of climate types ranging from predominantly humid tropical to monsoon and tropical savanna depending on precipitation. There are variances in climate types from arid to temperate as well, depending on elevation and effects due to topography between wind- and leeward sides of some islands. In addition, extreme weather phenomena are also typical to the Caribbean. The interplay between warm and cold water streams and the exposure to Atlantic low and high pressure oscillations give rise to pulses of dry periods and rainy seasons, including more extreme weather phenomena such as tropical storms and destructive hurricanes.

All these factors are important in considering how evolving regenerative agricultural systems might occur. As such, they point toward the imperative to create productive agricultural systems that both source from the knowledge and culture of

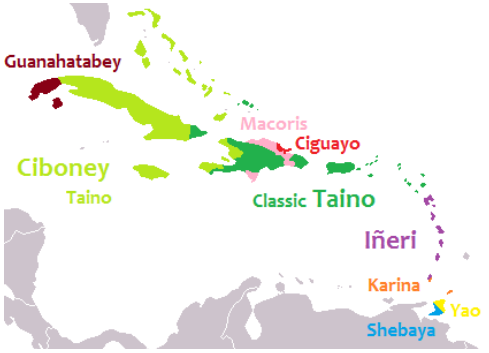


Image: Granberry & Vescelius (2004)

place, and accommodate the increasing extremes of climate and outlier weather phenomena: to mitigate risk, ensure resilience, and safeguard the long term vitality and viability of these systems to sustain life and thrive.

Indigenous culture is a prominent aspect of the Caribbean region. In spite of the destruction inflicted by colonialism, many places have maintained along the margins — or rediscovered — the indigenous roots of their communities and places. The preservation of indigenous culture plays a crucial role in our ability to successfully evolve regenerative agricultural systems, as it holds the wealth of knowledge about the flora and fauna, the geology, the soils, the hydrology, and the methods and techniques that are necessary to sustain productivity and ensure right livelihood in relation to the landscape and to place.

CHALLENGES

The Caribbean region has developed tremendously in the post-independence era and has managed to achieve relatively high levels on human development indices as well as middle-income status. (FAO, 2019) Nonetheless, the region continues to be confronted with significant socio-economic and climate-related challenges.

Challenges faced in the Caribbean:

- Low and variable economic growth
- Unsustainable debt and weak fiscal management
- High unemployment
- Vulnerability to the effects of climate change and natural hazards
- Environmental degradation
- Crime and increasing threats to citizen security
- Persistent and extreme poverty and food insecurity
- Distinctive gender inequalities

(FAO, 2019)

The Caribbean region remains susceptible to an increasing frequency of natural disasters, rising international debt, out-migration, rapid urbanization, and high imports to meet basic needs. Food and nutrition insecurity persists in these small island states, with around 67.5% of the population living in moderate or severe food insecurity. The role of agriculture, although of less economic importance on some islands in the Caribbean, remains a key factor in addressing many of these challenges. (Mohammadi et al., 2022)

In summary, the confluence of various factors make the Caribbean unique: its topography, the existing climate as well as the climate variances it faces in the near future, its socio-historical context, and its current position within the global economy. The successful development of regenerative agriculture in the vast array of possible Caribbean contexts demands the cultivation of a profound understanding of place: culturally, geophysically, and economically, as well as a community-centric approach to development that strives to ensure the long-term health and resilience of both the land and its inhabitants.

THE POTENTIAL OF REGENERATIVE AGRICULTURE IN THE CARIBBEAN

For a variety of reasons, agriculture in the Caribbean region has been in decline over the past two decades, in terms of competitiveness as well as productivity. Because of preferential trade agreements with the EU, a host of commodity crops — such as sugar cane, bananas, cacao, coffee, and rice — were grown in large quantities. However, due to the changes in these preferential trade agreements, demand weakened significantly as the Caribbean struggled to compete with global commodity prices. This reduction in demand led to structural reforms and even caused considerable reductions in the production of crops for local consumption. As an example of the economic disparity this has caused, Hugh Locke from the Smallholder Farmer Association mentioned that a country like Haiti — at one point a large producer of rice for domestic and export purposes — is currently highly dependent on the USA for its rice imports. (Locke, 2022)

Despite the on-going decline, agriculture is still a major source of employment in many Caribbean countries: approximately 16% of the overall employment in the region is in agriculture. Continued decline in agriculture will therefore have significant impacts on the economic and social viability of rural communities and, if left unchecked, will likely result in deterioration of real incomes and an increase in poverty rates in rural communities. (Tandon, 2014) Also issues faced in relation to food security and food sovereignty will be exacerbated by a continued decline in agriculture as well.

As a result, governments have been trying to address the constraints on the agricultural sector, which were brought forward by the Jagdeo Initiative back in 2005 and persist to this day, which include:

- Labor shortages, both unskilled and skilled labor
- Limited access to land: land tenure, poor land management
- A fragmented and unorganized private sector
- Inadequate transportation systems, particularly perishables
- Weak marketing systems and participation in growth markets
- Limited financing and inadequate new investments
- Weak national statistical systems for collection of agricultural statistics

(ILO, 2006)

Since the proposal of the Jagdeo Initiative, inaction has only worsened the situation:

- The gap between rich and poor has widened
- Since CV-19 food insecurity rose 78%
- Imports from the US rose 280% in the last 15 years
- Fertilizer prices have risen 180% in the past year
- Transport costs have soared and climb 8% per month on average

(Salmon, 2022)

Although the Jagdeo Initiative brought many of the pertinent issues related to regional food security to the fore, the last decade and a half have only seen a worsening of the situation. The rapid acceleration of declining conditions brought on by the CV-19 pandemic and rising inflation has brought the governments of the Caribbean community (CARICOM) to the table again, in the hopes of more seriously engaging questions pertaining to agriculture and food security.

The challenges that the Caribbean landscapes face, particularly related to agriculture, are manifold. Intensive monoculture cultivation of tropical soils has led to soil erosion and soil degradation. Year-on-year yields decrease as soil fertility declines, and increased vulnerability to weather extremes exacerbates the declining viability of agriculture into the future. However, many practices conducive to regeneration are part of the solution to these issues: employing cover crops, mulching, chop and drop, perennialization and agroforestry, and holistic grazing and silvopasture.

These are all practices that have yielded proven beneficial results in the Caribbean. In fact, a report compiled by the FAO on smallholder farming in the Caribbean noted that many practices conducive to regeneration are already observed by smallholder farmers in the traditional ways they farm. These include intercropping and mixed cropping. They also use modern systems such as greenhouse technology and organic farming. Production practices include sustainable practices such as integrated pest management, rainwater harvesting and micro irrigation. (Graham, 2012)

Additionally, a strong dependence on external inputs, and an inability to manage pollution well, has compounded the problems relating to ecosystem health, as well as farmer health and farm financial health. The above-mentioned FAO report confirms that many crop farmers use agri-chemicals: mainly fertilizers and pesticides (Graham, 2012). These, again, are issues that can be addressed by employing practices that diminish reliance on external inputs, as well as by increasing species diversity and incorporation of support species for integrated pest management.

Amongst various other sources, a study conducted by the Mustardseed Trust in 2020 highlights the many opportunities that are present in the Caribbean.

- In some places, policy and regulations are becoming more supportive of environmental protection and regenerative agriculture
- Economic instability indirectly creates the opportunity for innovation and alternative/regenerative business models
- Due to high numbers of tourists in the region, there is a significant opportunity for the integration of regenerative agriculture and tourism
- Perennial systems are prolific in the Caribbean, which allows for a more fluid transition to agroforestry and other forms of regenerative agriculture
- Generally, rainfall is high across the Caribbean, which is conducive to the establishment and proliferation of regenerative agricultural systems
- There is a high potential for ecological and financial diversification of perennial systems, both for land-based systems as well as marine and aquaculture systems

CHALLENGES TO SCALING

Incentives

One of the main challenges, when it comes to growing and scaling regenerative agriculture in the Caribbean (and worldwide), is the existence of the right incentives for the smallholder farmers. Although export-oriented commodity agriculture can fetch the farmers a price premium, smallholder enterprises that only supply the local markets - which comprises the lion's share of operations in most places - face buyers that will not pay a premium for regenerative. There is no direct financial incentive then for these smallholders to farm regeneratively, especially with the added (financial) risks that come with regenerative production.

Social and Cultural factors

The introduction of regenerative agriculture is often connected to the "West" and the Anglo-Saxon world. This may conjure up distrust and rejection, because it is seen as another colonial scheme. It is therefore critical to maintain true integrity of regenerative agriculture, which is grounded in local realities, local knowledge, and local farmer empowerment and ownership.

Political and Regulatory factors

Regenerative agriculture is a recent phenomenon in the domain of public and political discourse. In part, it is an affront to established industrial farming, as it advocates for interventions such as the reduction of external (chemical) inputs, which does not sit well with the agribusiness establishment. Although on a supranational level there is a willingness to address agricultural and environmental issues, on a national and regional level corporations have a strong incentive to influence the policies, practices and products that influence farmers and their agricultural enterprises.

Land Tenure

Access to land and the dynamic relationship smallholders have in relation to land tenure can pose challenges for trying to establish regenerative agricultural systems with long time-horizons. Farmers often do not own the land outright, which creates less of an incentive to take care of it properly.

Lack of developed infrastructure and markets

Growth in agricultural productivity has been slow, and the sector suffers from high trade costs, tariffs, and a low capacity to comply with modern food safety and quality standards. In certain cases, as in poorer countries such as Haiti or Jamaica, this can be something as simple as a lack of proper storage and/or refrigeration, or the lack of proper infrastructure.

As the FAO report on agriculture in the Caribbean elaborates, the region has been unable to adequately respond to rapidly growing demand for high-standard agri-food products from the tourism, processing, and retailing sectors, in and outside the region. (FAO, 2019) This has for the past two decades been a clear structural impediment to the establishment of food security in the region, as well as a major hindrance in terms of proliferating international exports.

Financial factors

Regenerative agriculture, especially in its initial stages, carries with it increased risk and upfront investment costs, which in some cases are not necessarily regained in the short term. To make matters worse, many farmers — as is the case worldwide — are already heavily indebted to agribusiness, which makes them less likely to want to take on further financial risk. While micro-loans can play a role in supporting farmers' financial health, the investment of brands and off-takers has the potential to ensure the establishment of regenerative agriculture systems, from which these companies can then source regenerative produce.

PATHWAYS FOR SCALING REGENERATIVE AGRICULTURE

Although each place will have its unique set of opportunities and constraints, we can glean various pathways to growing and scaling regenerative agriculture in the Caribbean context from looking at the insights and lessons learned in the development of agricultural systems in the Hispaniolan context. Components that play a key role are:

Evolving projects through farm community centric approaches, place-sourced strategies, and involvement of the local community.
In the development of smallholder RA systems, the farmers and their community take center stage — both in terms of sourcing from their (indigenous/traditional/cultural) knowledge of farming and stewarding the landscape, as well as addressing their needs and those of the systems in which they are embedded. One way of supporting this process is by collectively developing a "story of place" that embeds local knowledge and know-how, in a wider narrative of bioregional and biophysical aspects of the landscape.

Supporting the process of farmer organization
(Self-)organized farmer collectives or cooperatives have a much higher degree of success due to a host of factors. Firstly, organized farmers acquire stronger market positions through aggregating produce, increasing income, and mitigating financial and crop failure risks. Graham confirms that the key constraints to overcome are small volumes, poor risk coverage and the unmanaged heterogeneity which defies any semblance of the desired levels of organized and consolidated enterprise approach in small farming. (Graham, 2012).

Furthermore, collectively farmers can more effectively gain access to education, skill development, and social-, financial-, and technical support. Importantly, organized farmers have governance structures in place, which facilitates internal functioning and unlocks their ability to work together with other third party organizations.

Forging multi-stakeholder alliances and collaborations
RA systems are not siloes of farmers and farms. Instead, they are complex multi-stakeholder endeavors centered around farms, farmers, and their communities. When approached as such, supporting the development of alliances and collaborations around farmer cooperatives is a precondition for long term success. RA systems composed of key stakeholders operating under mutually beneficial relationships allow for streamlined supply system dynamics, mitigation of financial risk for farmers, technical support for implementation and maintenance of RA systems, context specific farm systems, support with navigating bureaucracy and regulations, etc.

The demands of successful commodity value chains are complex and reach outside of the sector. In the absence of public policy and adequate public financing for commodity value chain development, a formula will have to be reached at national or sub-regional levels to engage the support of relevant players outside of the sector, through organic and financing linkages. (Graham, 2012)

Working with the right people and navigating the system

Building off the previous pathway, which emphasizes RA systems as wholes instead of siloes, '*working with the right stakeholders*' refers to the types of roles that are important in the constellation of stakeholders of the RA system. Some key stakeholders are:

- *Farmers and their farms:* the heart of the RA system
- *Farmer leaders*: a force behind organizing farmers and liaising with 3rd parties
- *Communities*: the social and economic context of farmers and farms
- *Changemakers*: connecting local realities with regional and global incentives
- *Technical support*: partners providing support with logistics and knowledge
- *Administrators*: support with navigating bureaucracy and regulation
- *Keystone buyers*: off-takers that ensure the financial viability of the RA systems
- *Investors*: 3rd parties supporting the financial infrastructure around RA systems

There is much variability in the way these roles take shape in practice; however, most of these roles are essential in one way or another for long-term success, and as such convening and aligning these key stakeholders is of pivotal importance.

The importance of incentives, market diversification, developing markets, and financial infrastructure

Financial viability, vitality, and evolutionary capacity is of central importance to any smallholder RA system. This financial reality manifests across various layers of the RA system, some aspects are: creating the right incentives for farmers, finding more balanced market diversification across: commodity export crops, crops for local markets, and crops cultivated for subsistence and food sovereignty. Furthermore, supporting the development of markets for secondary/ancillary crops, and aligning stakeholders that play essential roles to support the financial infrastructure of RA systems.

The important role of financing arrangements and private, public and institutional support, including those outside of the sector, has largely been underrecognized. These are institutions with which traditionally the majority of small farmers have had difficulties and failures to establish mutually satisfactory and lasting connections. (Graham, 2012)

The potential of connecting RA with tourism

Strengthen tourism-agriculture linkages. Specific suggestions are for the development of community based tourism products such as eco-tourism, rural-tourism, agro-tourism; and new tourism co-operation processes such as tourism product clubs and enterprise networks. (Miatton & Karner, 2020)

The role of data

Improve statistical systems and increase research and development activities. Countries should undertake regular agricultural censuses and produce up-to-date agricultural statistics to facilitate research in areas such as the dynamics of the agricultural labor market, productivity of resource use, and the scope for new agricultural crops and processed commodities. (Miatton & Karner, 2020)

The importance of logistical infrastructure

The physical and material reality of RA requires an adequate logistical infrastructure to accommodate the basic requirements for production, storage, transportation, processing, refrigeration, etc. As indicated before, in some contexts it is some aspect of this infrastructure that is lacking, which then becomes a bottleneck for streamlining the process of bringing good quality produce to market. In addition there is the question of seeds and plant material. Since RA is predominantly composed of diversified systems, it can be challenging to access the required seeds and plant material.

The Haiti Regenerative Cotton Origin with Smallholder Farmers Alliance (SFA), is a great example of how community farmer hubs can fulfill many functions that accommodate the development of RA. They are plant and tree nurseries and seed dispensaries, providing farmers with source material for cultivation. They are also social places where farmers can meet and converge over shared challenges or places where learning can take place. In addition these hubs can double as demonstration sites, and places to aggregate and store produce from farmers and distribution centers for markets.

Scaling Strategy for Smallholder Regenerative Agriculture: South America

Image: Muir Way, www.muir-way.com

INTRODUCTION TO THE REGION

Recognizing the vastness of the continent, and the wide-ranging differences in culture, economy, climate types and geography, the goal of this section is to identify patterns and trends that might not apply to all countries and regions in question, but can indicate directionality when considering opportunities, constraints, and the potential for growing and scaling regenerative agriculture in South America.
This section takes as a primary point of reference the Terra Genesis-UOPROCAE collaboration around the development of a Regenerative Cacao Origin in Ecuador, and gathers from it many valuable insights around growing and scaling regenerative agriculture in the South American context.

SOUTH AMERICA FACT SHEET:

- As of 2021, South America's population has been estimated at **more than 434 million**
- Most of the continent lies in **the tropics**, with Argentina, Uruguay, Paraguay, and Chile in the **subtropical and temperate regions** south of the Tropic of Capricorn
- The geography of western South America is dominated by the **Andes mountains**; in contrast, the eastern part contains both **highland regions and vast lowlands** where rivers such as the Amazon, Orinoco and Paraná flow
- Brazil is by far the most populous South American country, with **more than half of the continent's population**, followed by Colombia, Argentina, Venezuela and Peru. Brazil also generates **half of the continent's GDP.**
- Most of the population lives near the continent's **western or eastern coasts** while the interior and the far south are sparsely populated.
- The continent has a rich cultural **heritage of indigenous peoples**
- Current population is a **mix of indigenous peoples** with predominantly **European and African** ethnicities

Indigenous culture is prominent in South America, and in fact it is one of the few remaining places on earth where pockets of indigenous peoples still live in accordance with their traditional ways. Their existence is under the threat of modernization and habitat destruction. Efforts to support indigenous culture and heritage are of key importance to our ability to successfully evolve regenerative agricultural systems. As mentioned before, indigenous knowledge holds the keys to our ability to understand and work with the landscape and with place.

The development of agriculture in South America has rightfully earned the reputation of being among the most successful in modern times: it has been feeding a rapidly expanding population, supported economic growth, generated surplus exports, and helped fortify global food security and drive down poverty.

However the success story of South American agriculture, the image of the region's agricultural systems as productive, dynamic and efficient, reflects only part of a more complicated reality. These impressive achievements have come at the expense of significant environmental and health costs. Agriculture in the region uses over one-third of the land area, consumes nearly three-quarters of the fresh water resources, and generates almost one-half of the region's greenhouse gas emissions.

Despite consistent food production surpluses, millions of people regularly go hungry or suffer from malnutrition and related diseases. In short, the region's successes in feeding the population and exporting food to the rest of the world are exacting high costs on people and on the environment. (Morris et al. 2022)

As the most biodiverse region on the planet, and now as the world's largest net food exporter, Latin America is positioned to show the world how biodiversity can be a core source of agricultural productivity and profitability. Meanwhile, the convert-and-deplete approach to farming continues to threaten some of the world's most environmentally sensitive natural habitats – from the Amazon forests and Argentina's Gran Chaco to Colombia's Orinoquia and through to the biodiversity hotspots of Central America and Mexico. (The Nature Conservancy, 2018)

Land-use change, such as deforestation for agriculture purposes, is the biggest driver of environmental degradation in Latin America. In Argentina, for example, this accounts for 94% of the loss of ecosystem services.

The agroecology movement in Latin America is one of the most powerful advocates of ecosystem-level thinking in agriculture. It borrows from traditional and indigenous local farming practices and combines it with experimentation free of pesticides, GMOs, and other agricultural innovations from the Green Revolution with negative externalities. Many multinational corporations are making regenerative commitments that will take place on the ground in Latin America. (Silverman, 2022)

AGRICULTURAL FACT SHEET:

- More than **68% of arable land** in South America is **subject to erosion**
- Latin America hosts **over 50% of the world's biodiversity**, 31% of its freshwater, 12% of its mangrove forests, and the largest expanse of wetlands
- The region's economies are largely **built on natural capital** and resource extraction
- By 2028, **25% of all global agricultural and fisheries exports** will be from Latin America
- In particular, **46% of agricultural GDP comes from livestock**, which is mainly focused in Brazil, Uruguay, Paraguay, Mexico, and Argentina
- The four countries with **the strongest commodity agriculture** are Brazil, Argentina, Chile and Colombia
- South America runs a net export surplus and is **amongst the leaders in the production on many commodity crops**, including sugarcane, wheat, soy, coffee, maize, tobacco, pineapple, banana, cotton, beans, coconut, lemon, cocoa, cashew, avocado, persimmon, mango, rice, oat, sorghum, peanut, fig, peach, palm oil and natural rubber.
- South America produces **20% of the world's beef and chicken meat**. Brazil is one of the world's largest exporters of meat and dairy

(FAOSTAT, 2022) (UNEP, 2016)

THE POTENTIAL OF REGENERATIVE AGRICULTURE IN SOUTH AMERICAN

Despite the challenges that South America faces as a consequence of the externalities of rapid economic growth and the expansion of industrial agriculture, regenerative agriculture is gaining more traction. As is the case with the Caribbean, there are similar tendencies that position South America favorably with regards to the development of RA:

- There is increased political will to take a proactive role in environmental issues
- Policy and regulations are becoming more supportive of environmental protection and regenerative agriculture
- There is opportunity for innovation and alternative/ regenerative business models, indirectly brought on by economic instability
- There is a large base of indigenous and traditional agro-ecological knowledge to draw from
- Perennial systems are prolific, especially in the tropical regions of South America, which facilitates the transition to agroforestry and other forms forms of regenerative agriculture
- There is a high potential for ecological and financial diversification of perennial systems land based systems as well as marine and aquaculture systems
- Extensive cattle operations have great potential for silvopasture and holistic grazing systems

In addition:

No-till and reduction of inputs are popular as cost savers with ecological benefits

Latin America has experienced a much faster and greater adoption of no-till practices than the U.S., with Brazil coming in at an estimated 75% no-till adoption rate.

The economics of no-till make for a great fit in tropical soils and potentially drier climates. Even now, the Brazilian government has committed to cutting carbon emissions from its farming sector by over a billion tons by 2030. Various on-the-ground networks of producers have led the charge towards more regenerative practice. A key example is Ovis21, a hub for regenerative grazing helping hundreds of pastoralists across thousands of hectares throughout Argentina with technical assistance and environmental monitoring. (Silverman, 2022)

Pertinence of environmental issues is shifting political and regulatory environments

The current global shift in narratives concerning human impacts on the environment: RA is increasingly perceived as a timely solution to face the current and future planetary challenges of climate change, biodiversity loss and environmental degradation. Governmental support for such solutions is expanding in line with increased awareness amongst policymakers and the general public.

Image: Bernardo Camara https://projetocolabora.com.br

Several Latin American nations, such as Uruguay, Bolivia, Ecuador and Costa Rica, present favorable policy environments for RA to unfold. For instance, Uruguay is a small country that largely depends on its meat exports (26.9% of total exports in 2019). Movements that support holistic grazing and organic agriculture are well established, and often connected with the Uruguayan government and policy makers. (Miatton & Karner, 2020)

South America is innovating agribusiness models

Economic instability and hardship affecting Latin America is also an opportunity to rebuild local economies based on RA principles. Although free market proliferation has helped to open up the market, this has mainly just benefitted large corporate businesses, and not smallholder farmers or medium size enterprises. (IAASTD, 2009) Latin American producers are continuing to struggle to remain competitive in the global market, and to maintain the health of their land. They are therefore seeking alternatives, while vulnerable populations are also looking for new subsistence models.

Image: https://onamiap.org/

Prevalence of smallholder farming and agroecological traditions

As mentioned above, the fact that small-scale farming and agroecology are widespread and deeply rooted in Latin America provides fertile ground on which RA can emerge and further build on agroecology.

Indigenous and campesino knowledge

Latin America has a great wealth of indigenous and campesino (peasant) knowledge to draw upon. Finding inspiration within and disseminating these forms of knowledge is key to rooting and embedding RA into local eco-cultural contexts, preserving indigenous varieties and weaving RA into Latin American realities. (Miatton & Karner, 2020)

The potential that draws on the richness of South American biodiversity

The wealth of traditional Latin American knowledge is reflected by, and indeed drawn from, the extraordinary diversity of Latin American ecosystems and the biodiversity of fauna and flora that they harbor. This opens up a universe of possibilities for RA in terms of production, knowledge exchange and research. (Miatton & Karner, 2020)

[South America] has one of the greatest endowments of natural capital in the world, which is a source of economic growth and has the potential to become the world leader in offering the services its ecosystems and biodiversity provide, and in return receive new benefits from this conservation and sustainable management. (Bovarnick et al. 2010)

CHALLENGES TO SCALING

The South American context has seen much change and development in recent decades. Beside a tumultuous political landscape, much has been moving economically, socially, and ecologically. The following assessment of some of the main challenges to scaling in the South American context draws heavily from sources including the Mustardseed Trust report on Regenerative Agriculture in Latin America and the Future Foodscapes report commissioned by the World Bank.

Cultural entrenchment of industrial farming

Since the advent of the green revolution, the use of petrochemical inputs and pesticides is ubiquitous and accepted as the norm, and particularly entrenched in farming practices in South America. Deviation from that model of industrial farming brings up uncertainty with farmers and a fear of increased risk.

Entrenchment of industrial farming on a governmental and regulatory level

Some governments in South America — notably Argentina, Chile, and Brazil under the right-wing government — have been slow to accept regenerative agriculture and agroecology due in part to the aforementioned entrenchment in industrial agriculture and the business interests involved. Agribusiness as usual is often the rule in Latin America, underwritten by subsidies for the largest and most well-connected actors of the sector.

The scarcity of RA showcases and well-established success stories complicates the process of supporting RA. There is thus a strong need for pilot projects to showcase RA's potential in Latin America and to raise awareness on and garner political support for RA.

The costs and risk of RA

RA is costly, in terms of upfront costs, bridging the transition, and certification or verification processes. As such, it carries financial risk, which acts as a deterrent to smallholder farmers. Moreover, the global market for RA produce is still very small and the local markets are practically non-existent, thus no price premium currently offsets the investment costs and risks involved.

Short value chains for regenerative produce are more difficult to establish for low-value commodity crops. For example, the value of high-quality organic coffee is very high. Conversely, staple crops (e.g. corn and soybean) are valued in terms of quantity, not quality, making it more difficult to sell them at a premium price despite their regenerative attributes.

Although niche products such as specialty coffees and fine flavor cocoa allow for the decommodification of value chains and revenue redistribution to producers, they are inherently limited by customer demand for high quality products. (Miatton & Karner, 2020)

Cultural Factors

RA is mainly communicated in English. It must overcome the language barrier and communicate in Spanish, Portuguese and key indigenous languages (such as Quechua, Guarani, and Nahuatl) to engage local populations and further connect with grassroots social movements, agroecological actors and indigenous and traditional groups. (Miatton & Karner, 2020)

Land Tenure

Access to land and the dynamic relationship smallholders have in relation to land tenure can play a challenging role in trying to establish regenerative agricultural systems with long time horizons. Farmers often do not own the land outright, which creates less incentive to take care of it properly.

Incentives

A central challenge — in the South American context as well as elsewhere — is having the right incentives in place for smallholder farmers. In many cases, this means a price premium for produce. However, local markets are reluctant to pay this premium, and so incentives need to be found all along the value adding process. Farmers — like any business — are heavily dependent on their financial bottom line. If there is no financial incentive for smallholders to farm regeneratively, all the good will in the world will not add up to the change that is necessary. Innovations like data as a farm product can play an important role to monetize other aspects of growing for local markets, or even for food sovereignty.

PATHWAYS FOR SCALING REGENERATIVE AGRICULTURE

An IFAD report written by its then-president Kanayo F. Nwanze put forward four important sets of interventions to help smallholders scale their operations that apply to scaling regenerative agriculture as well.

Four sets of interventions are urgently required: first, a step increase in investment in agriculture and rural development across all aspects of the production cycle. This includes infrastructure, technical assistance and rural financial services. Second, the strengthening of capacities, within each country, in terms of a policy framework for reducing rural poverty and promoting effective government institutions. Third, more private sector involvement in agricultural services, such as finance and marketing and the development of public-private partnerships. Fourth, the promotion of agricultural research to allow new and improved technologies to be developed and shared. (IFAD 2010)

These issues continue to remain pertinent for the viability of smallholder agriculture in general. Some additional pathways specific to scaling regenerative agriculture include:

Adapting to Local Context and Developing Key Farms as Demonstration Sites and Places for Collaboration

The role of sourcing from place as a key driving force for the evolution of regenerative agricultural systems: sourcing from indigenous/traditional/local knowledge, local (farmer) community centric development, working with the unique character of the landscape. Unlike in industrial agriculture, there is no generic approach to regenerative agriculture

in South America. Indeed, an important aspect of RA innovation consists in adapting RA to different local contexts. This highlights the essential role of engaging with context-specific examples of best practices at the local level. (Miatton & Karner, 2020)

Using data as a farm product, and a tool to inform farmers' decisions

Data can play many important roles in RA, which can directly and indirectly support growth and scaling efforts. Data can be used to monitor ecological and social variables, which can be used to indicate the state of the RA system, how it is evolving, and what interventions it might need. That way it can show farmers where opportunities are in space and time. This way of using data allows for a more precise way of farming and increases the ability to manage and improve regenerative agricultural systems based on empirical data and feedback. In aggregate that data serves to give valuable statistical insight into the state of RA systems on larger scales and to monitor in what ways those systems are able to reach markets and what tweaking, redirection, or interventions might be needed to improve.

In addition, there is an innovative role for data as a farm product. This proprietary data is collected and held by the farmers and can be sold for varying purposes, one of which being as a means for companies to make claims about the produce's regenerative origins. Data as a farm product can create a premium that incentivizes the farmers without compromising their competitiveness, and as such can lead to more financial health.

Investing in infrastructure and logistics

One of the most important structural impediments to smallholder growth and scaling of RA is the lack of proper infrastructure. Although it is a point that affects smallholder farmers across the board, by extension it acts as a bottleneck for the development of RA as well. What is required is a step increase in investment in agriculture and rural development across all aspects of the production cycle. This includes infrastructure, technical assistance and rural financial services. (IFAD, 2010)

Innovations in mechanization

The right type of mechanization is necessary to make large-scale RA operations viable, while decreasing the mechanical and labor costs of RA. Lighter, more flexible and multifunctional tools are required to replace today's heavy, costly machines that often have only one specific use.

Organizing farmers in collectives or cooperatives

Farmers need to organize and collaborate in collectives or cooperatives, or equivalent entities. The form communities for mutual support and learning, it opens the way to a stronger market position, and it spreads financial risk. It is also conducive to the formation of farmer governance structures, which smoothen collaborations with possible third-party stakeholders.

Importantly - as mentioned - working together creates a community of learning as well as social acceptance, and practical support in business operations. In addition, the aggregation of produce gives farmers a stronger market position as well as mitigating the risks of low yields of failed crops.

Mitigating financial risk through RA as a multi-stakeholder endeavor

Capital investment and financial risk is a substantial consideration that deters many farmers from adopting RA, especially when produce is a niche product that cannot compete with normal market prices. This points toward the importance of the development of RA as a multi-stakeholder endeavor where financial risk can be mitigated through alliances, collaboration, and cooperation. Upfront investment costs can be carried by investors and offtakers, forward-facing contracts can alleviate seller uncertainty, and markets can be accessed by means of brokering commodity and ancillary crops.

The role of supply system stakeholders and of forging multi-stakeholder alliances is a way to catalyze the evolution of regenerative agriculture. It facilitates the ability to navigate local/national bureaucracy, tackle issues around local/famer community buy-in, it mitigates financial risk through offtaker involvement, and engages (local) partners to provide services in areas like logistics, infrastructure, and technical support.

Develop ecologically as well as economically diversified systems, focusing on food sovereignty, local markets, and commodity exports

There are unique challenges and opportunities that come with farming export commodity crops, farming for local markets, and subsistence farming. In smallholder RA systems diversification across all three these realms of economic scale is important — making species diversification the basis for financial resilience, as well as farmer food sovereignty.

South American biodiversity holds enormous potential for species diversification as well as untapped sources of climate resilient novelty crops

It is important to consider the potential that exists in the enormous range of untapped productive plant species that could be grown as novelty export commodity crops, but also as crops for local markets or for subsistence farming and increased food sovereignty. A smallholder regenerative agricultural system is likely to contain a balanced diversification along those three levels of nested markets. Novelty crops potentially have an important role to play there.

Scaling Strategy for Smallholder Regenerative Agriculture: Southeast Asia

INTRODUCTION TO THE REGION

Out of the 450 million smallholder farmers in the world, an estimated 100 million live in Southeast Asia. The key commodity crops in the region are:

- **Malaysia** – Palm oil, rubber, cocoa and wood products
- **Indonesia** – Palm oil, rubber, coffee, vegetables, and fruits
- **Vietnam** – Rice, rubber, seafood, coffee, cashew nuts, tea, and fruits
- **The Philippines** – Coconut oil, fruits, seafood, and tuna
- **Thailand** – Rice, rubber, sugar, fruits, coconut milk, processed tuna, and seafood

The legacy of colonialism and the Green Revolution has unfolded somewhat differently here than in Sub-Saharan Africa. With the introduction of improved cereal varieties — particularly of rice — fertilizers, irrigation, and modern pest control, the Green Revolution substantially reduced poverty in many Southeast Asian countries. The need for rapidly expanding markets incentivized governments to create supportive economic and policy environments.

At the same time, the Green Revolution left a legacy of many social and environmental problems. The slowdown in yield increases has led researchers to investigate the causes. They have begun to report the compounded effect of the unintended consequences of intensive monocrop agriculture: deteriorating water quality, degradation of soils, and build-up of toxins in intensive rice paddy systems. These problems can be traced to "excessive and inappropriate use of fertilizers and pesticides that pollute waterways and kill beneficial insects and other wildlife; irrigation practices that lead to salt build up and eventual abandonment of some of the best farming lands; increasing water scarcities in major river basins; and retreating groundwater levels in areas where more water is being pumped for irrigation than can be replenished." (Hazell, 2009)

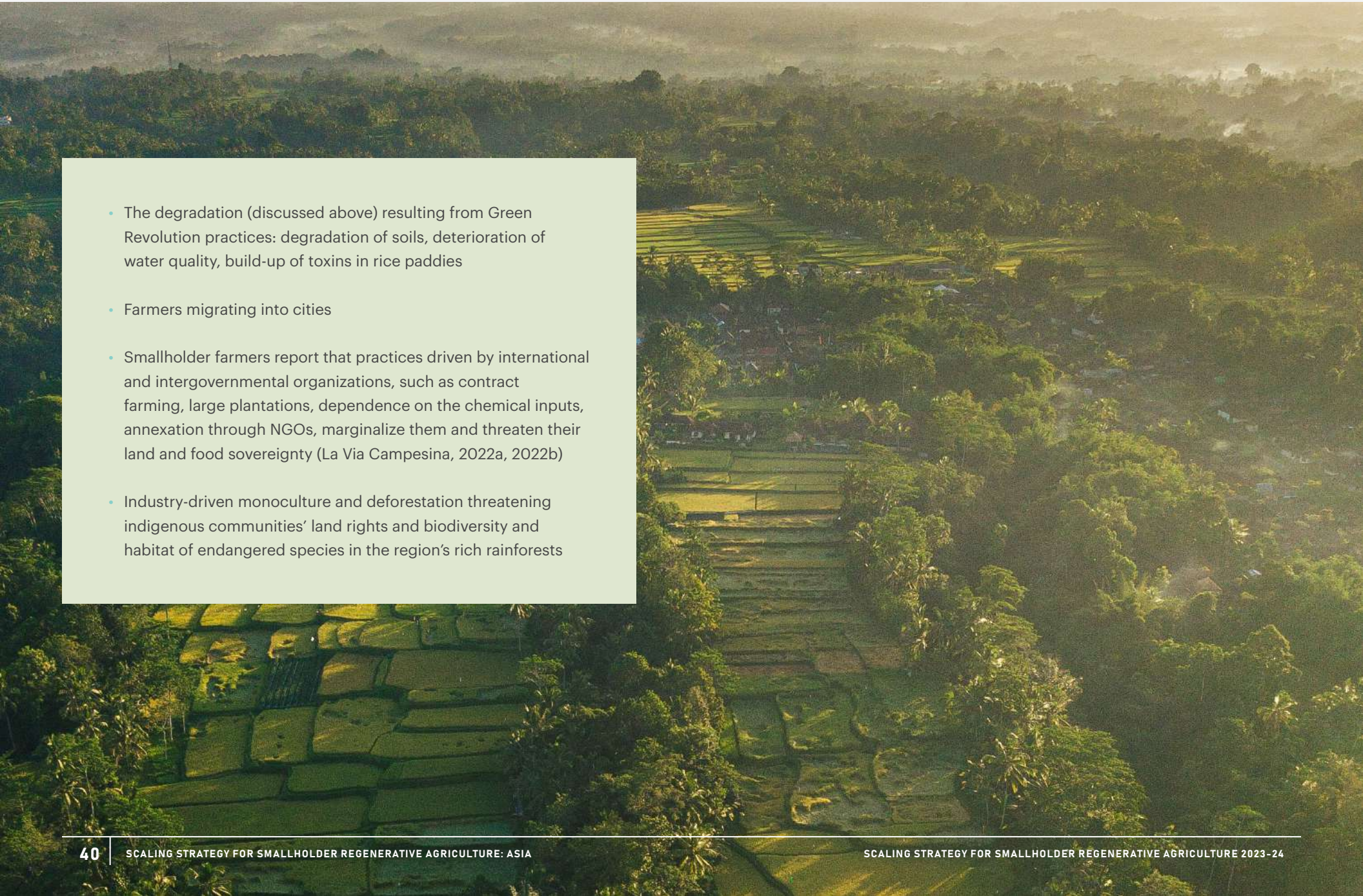
An intervention is clearly needed. Could regenerative agriculture deliver on its promise and support the revitalization of Southeast Asia's land, water, and living systems? To do so, it is clear that regenerative agriculture needs to be developed in this region in ways that are appropriate for Southeast Asia. The discourse of "regenerative agriculture" has originated primarily in North America and Europe, even as it draws on agroecological traditions from other parts of the world. Therefore, mainstream framing of regenerative agriculture has been shaped by the kidneys of landscapes and farming operations that are typical to the global industrialized north: namely, broadacre cropping and managed rotational grazing. In Southeast Asia, in contrast, farming landscapes are characterized by more agroforestry, rice farming, and specialty crops such as nuts, coffee and cinnamon.

To consider "scaling regenerative agriculture" in Southeast Asia, then, we have to pose the question: what does a distinctly Southeast Asian regenerative agriculture look like — an agriculture shaped by the region's distinct farm landscapes, the smallholder farmers who steward them, crops, operations, and agroecological traditions? Answering the question requires understanding the characteristic challenges in the region, and looking at a few case studies of uniquely Southeast Asian regenerative farming projects that have been successful.

THE POTENTIAL OF REGENERATIVE AGRICULTURE IN SOUTHEAST ASIA

- Very high natural and agricultural biodiversity with long cultural knowledge of uses and values reflecting the diverse and rich landscapes and ecologies
- Strong and ancient traditions of agroforestry systems that mimic and connect with natural forest while producing diverse and abundant yields (Thailand, Indonesia, Philippines, Vietnam)
- Other integrated agro-ecological practices such as rice-fish, rice-duck, rice-shrimp, "yoke rong" (similar to *chinampas* in Mexico) which support diverse ecologies, multiple yields, and nutrient recycling — thus also reducing or eliminating the need for fertilizers and pesticides (found in Thailand, Vietnam, Indonesia, Cambodia, Lao).
- Modern application of agroecological traditions with commodity crops (such as rubber agroforestry, coffee agroforestry, coconut agroforestry)
- Local movements and support for ecological practices and restoration, including support from local government agencies and private sector
- Well developed infrastructure and local processing capacity to add value to agricultural products (Vietnam, Thailand, Malaysia, Singapore, Indonesia)
- Location is strategic in terms of trade with many seaports and ready access to major markets worldwide.

CHALLENGES TO SCALING



- The degradation (discussed above) resulting from Green Revolution practices: degradation of soils, deterioration of water quality, build-up of toxins in rice paddies
- Farmers migrating into cities
- Smallholder farmers report that practices driven by international and intergovernmental organizations, such as contract farming, large plantations, dependence on the chemical inputs, annexation through NGOs, marginalize them and threaten their land and food sovereignty (La Via Campesina, 2022a, 2022b)
- Industry-driven monoculture and deforestation threatening indigenous communities' land rights and biodiversity and habitat of endangered species in the region's rich rainforests

The regional challenges and opportunities point to a few key insights regarding what we might call ingredients of a distinctly Southeast Asian regenerative agriculture.

Draw on Indigenous or Traditional Models

Several of the case studies discussed later in this report have originated from local communities themselves, from their own traditional farming practices and methods. The Wanakaset rubber project draws on a locally developed philosophy of forest farming, Wanakaset, which the rubber farmers had been practicing for a long time before they brought the rubber to the global market. The Vietnamese integrated pond-garden-pigs and poultry system (VAC), the Chinese mulberry-silk production system, and the integrated rice and duck farming system all draw on traditional Asian farming systems.

To be successful, it is not possible to select a template that has been developed in an entirely different climate, cultural and agricultural context, and apply it without adapting it. To develop regenerative agriculture in Southeast Asia, it would be valuable to incorporate — and adapt — time-tested models and systems that draw on the region's own agricultural wisdom.

Diversity of Species, Diversity of Relationships

The Wanakaset rubber project, VAC farming system of Vietnam, the Chinese mulberry-silk production system, and the integrated rice and duck farming system all illustrate a similar idea: integrating different livestock species and different plant crops within the same system so that the byproducts of one element in the system (e.g. fish manure, duck manure, pond sludge) support and meet the needs of another element. This is one of the characteristics of indigenous agroecology that the developers of permaculture design turned into design principles: "relative location" and "stacking functions."

Think Holistically

The IBIS Rice project zooms out of the rice paddy landscape to consider the surrounding forest ecology and how the rice farmers can support wildlife conservation.

Similarly, the emerging efforts to integrate diverse agroforestry into oil palm production systems in Indonesia consider the larger whole that oil palm plantations are a part of: the rich and biodiverse rainforest with its charismatic endangered megafauna. By making oil palm farms more forest-like, or at least integrating forest-like edges next to them, they seek to preserve habitat for the critically endangered wildlife.

Support Smallholder Farmers

As in the other regions considered in this report, smallholder farmers in Southeast Asia need both financial and technical support to transition to new farming practices, farming systems or enterprises. Smallholder farmers themselves should not be expected to bear all the risk that such a transition entails. Micro-loans and micro-financing, crop insurance to guarantee crop yields in the event of extreme weather, forward contracting, premium pricing, and technical or agronomic support are some of the ways in which the public and private sectors can lighten the burden and risk of the transition.

Building a Supportive Policy Environment

Political and policy environment — which differs from one country to the next — is one of the key factors shaping the potential for scaling regenerative agriculture in Southeast Asia.

The political and policy environment in Thailand is conducive to regenerative agriculture projects. Unlike in some other countries, farmers here have relatively secure land access and land tenure. Thailand has been quite open to foreign businesses establishing themselves there.

Neighboring Indonesia has a political situation that is similar to Thailand in this regard. As a country, it has maintained a strong sense of a distinct cultural identity, a sense of pride in its cultural heritage, and maintenance of its cultural norms. Here, too, there is potential for projects that draw on traditional or place-sourced farming practices.

In Laos, more constraints are placed on the private sector in general, and the entrance of foreign business in particular. On the other hand, government representatives have actual on-the-ground farming knowledge: it is required that they spend some time gaining farming experience out in the field. So they have a degree of agronomic understanding, and potentially can relate to farmers, better than in many other places.

In Vietnam, like in Laos, it is also necessary to work with the government to establish projects.

Traditional and indigenous crops

Bringing back traditional and indigenous crops, whether for local use or for the export markets, is an example of a new kind of product or offering that could be developed. It is critical that the impetus to do so comes from the community itself that holds the traditional knowledge about using such crops, and that structures are put in place to protect biological and intellectual property.

Integrated products from integrated systems

Some of the world's most ingenious, waste-free, closed-loop farming systems are found in Southeast Asia: the Vietnamese VAC system or the Chinese mulberry-silk system discussed above are good examples. Even though such systems are traditionally practiced on a small scale, it is worth exploring whether they might be expanded enough to produce meaningful volumes of product for markets without losing the integrity of the system. If yes, such products could tell a compelling story about the importance of integrated, highly diverse, multi-species and multi-crop farming systems in which all the elements exist in a web of interrelationship with one another, and waste and the need for external inputs is minimized.

CASE STUDIES OF WHAT SOUTHEAST ASIAN REGENERATIVE AGRICULTURE COULD LOOK LIKE

In the following, we consider a few examples of successful agricultural projects in Southeast Asia that may be considered regenerative, whether the word 'regenerative' is used or not.

When considered together, they may help us identify certain patterns and principles that characterize successful regeneration in Southeast Asia.

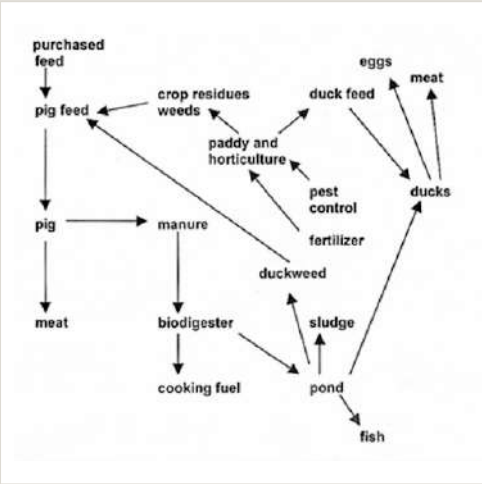
THE WANAKASET RUBBER PROJECT (PHATTHALUNG PROVINCE, THAILAND)

The Thailand rubber pilot with the Wanakaset rubber farmers makes for an excellent case study about scaling regenerative agroforestry in Southeast Asia. It demonstrates the importance of a local or indigenous node of energy that can power a successful and productive regenerative agriculture project. The rubber project emerged from the active collaborative energy of the original Wanakaset farmer group and their relationship to the land, to its unique ecology and history, and to the rubber forests. "Well-intentioned NGOs have failed disregarding this aspect," says Michael Commons, Terra Genesis' regional coordinator in Southeast Asia. The Wanakaset project built on an existing, functional body of knowledge of practice within the farmer group, a proven concept of rubber production that farmers could trust – especially if they could learn from examples within their community amongst other farmers.

Another factor that has made this project successful is the inherent diversity and complexity of the rubber agroforestry system. The rubber farmers integrate a range of other plants and species into their rubber forests. These include native hardwood trees such as Hopea odorata and Shorea roxburghii, fruit trees including mangosteen, salacca, and champadek, native vegetables including Gnetum gnemon and edible ferns, herbs, spices, and material crops. Native bees also may be integrated in these systems.

Finding a committed market partner was essential for scaling the project. The fact that VF Corporation committed to supporting the project long-term and engaging in a developmental process with other stakeholders has made it possible for the project to flourish and grow. Indeed, another factor that has been key to the success of the regenerative rubber project is the enterprise ecosystem of multiple stakeholders with multi-lateral connections, from project developers to academic researchers, government, the market partner VF Corporation, and other partner organizations.

The Wanakaset rubber project is now on the cusp of rapid expansion. One of the challenges is whether its integrity and wholeness can remain even as the project grows into communities that haven't historically held the Wanakaset philosophy.



MULTI-SPECIES INTEGRATED AGROECOLOGY (VIETNAM)

The term VAC farming comes from the Vietnamese words *vuon* for 'garden,' *ao* for 'fish pond,' and *chuong* for 'pig or poultry shed.' The three components sum up a small-scale system of highly-productive domestic agriculture in which food gardening, aquaculture and animal husbandry are integrated. This is a traditional type of farming that has been developed in the Red River delta of Vietnam.

In VAC, a pond is dug and the excavated material is used for building or creating raised garden beds. The pond is filled by rainfall or occasional flooding, creating the opportunity to raise a variety of fish species as well as aquatic vegetables. Farmers grow intercropped crops on terraces that maximize the use of sunlight. Pigs and poultry are fed by garden by-products and their manure, in turn, is used as fish feed. The sludge from the pond can, again, be used as fertilizer.

"VAC integrates different types of plant and animal cultivation into a compact space, linking the different growing enterprises to create an interconnecting flow of materials, powered by gravity. VAC is an example of farming in a way that brings natural ecological processes into the agricultural production system, also called 'agroecology'. In areas where VAC is practised, farmer revenue can be 3–5 times, even 10 times, more than growing two crops of rice per year." (Ellen MacArthur Foundation, 2022)

The VAC model, originally developed for the Red River delta of North Vietnam, has been modified to suit other regions within Vietnam as well, incorporating some different animal breeds and plant species.

This shows that it is possible to adapt and extend a specific traditional model that combines symbiotic plant and animal species, but do so in a way that suits the local context.

Other examples of such systems are the integrated duck-rice farming practiced in many parts of Asia, as well as the use of mulberry-fish pond model developed in Southern China (ICCO Cooperation 2022; Inside Flows 2022).

Rice

In Cambodia, IBIS Rice is a social enterprise that works with Cambodian farmers to protect the Giant Ibis, the Cambodian national bird living in the northern plains. The Wildlife Conservation Society, which launched IBIS Rice, pays a 15% premium to jasmine rice farmers in exchange for committing to zero deforestation and zero poaching. The farmers harvest once a year and allow the Ibis birds to feed on the grains the rest of the time. The Wildlife Conservation Society and the forest farmers devised this plan together in 2009. IBIS invests its profits in community development.

Coconut

The surging demand for coconut water, coconut milk and other coconut products has made many farmers resort to chemical-intensive monoculture farming. The soils on the monoculture coconut farms are often compacted, eroded, and unable to absorb water. As climate change brings more erratic and extreme weather patterns, whatever topsoil is left gets washed away.

An example of regenerative agricultural production driven by a food company is the coconut project developed by Harmless Harvest, a maker of coconut-based products. The project is developed in partnership with the Danone Ecosystem Fund and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the Regenerative Coconuts Agriculture Project (ReCAP).

Harmless Harvest's ReCAP project supports farmers in establishing cover crops, which create a green mat all across the coconut production area, retaining soil moisture and staving off erosion. Farmers also practice mulching and intercropping, and add beehives to the farm landscape. The project also includes a social and educational component: "ReCAP will provide farmers with training curriculum on farm management, soil health and more, while also providing best practices to increase biodiversity, and farmer resilience through intercropping, cover crops, bee-keeping and organic inputs." (PRNewswire, 2020)

Palm oil

Indonesia, especially Sumatra, is one of the world's greatest biodiversity hotspots, and home to numerous critically endangered species, the Sumatran tiger and the orangutan perhaps best-known among them. In the last few decades, oil palm plantations have been the primary driver of deforestation, rapidly devastating the forests that are both home to these critically endangered species and form the foundation of traditional lifeways for local communities.

The African Oil Palm *(Elaeis guineensis)* is one of the most useful oil crop species known to humanity, and at the same time one of the most contentious. Conventional palm oil is one of the most environmentally destructive commodity crops. It is usually grown in extensive monocultures reliant on agrochemicals. The encroachment of palm plantations on native forest in Southeast Asia and elsewhere have resulted in massive loss of biodiversity, CO2 emissions, and human rights abuses.

The oil palm itself is not the problem; it's the way it's been grown. The oil palm is in fact a culturally and ecologically significant keystone crop. Traditional oil palm agroforestry systems in West Africa (and Bahia, Brazil, where enslaved Africans were relocated along with their crops) represent highly complex agricultural systems with a great variety of interplanted crops and including rotation of livestock.

It is therefore possible to grow the oil palm differently, in highly diverse agroforestry systems that mimic the natural forest and support local food sovereignty (van Wijnberger and Smith, 2020).

At a commercial scale, a few pioneering projects are now experimenting with some regenerative agriculture practices such as agroforestry into, or adjacent to, palm oil plantations (Bryce, 2022) (Musim Mas, 2022).

Key Insights

KEY INSIGHTS:
GROWING AND SCALING REGENERATIVE AGRICULTURE

How to grow and scale regenerative agriculture globally is a tremendously complex question. This cursory investigation into the potential of scaling regenerative agriculture in a smallholder context, across various regions has highlighted some themes that are more region specific, and other themes that have emerged across geographies. The themes that come to the fore across geographies gives us a tentative understanding of patterns that apply across RA systems, which can lead to higher success and long lasting change.

These themes are of key importance to varying degrees to grow and evolve regenerative agriculture in the smallholder context. They hold much potential to bring about impactful change, and as such need to be explored in more depth.

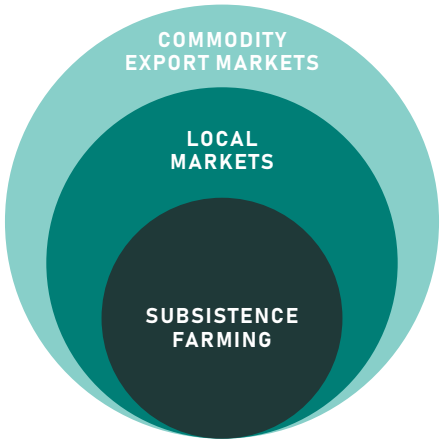
A summary of key themes and key insights for further exploration:

Support Smallholders

The pivotal role of smallholder farmers to the growth and scaling of regenerative agriculture, and the unique challenges they face as well as the unique opportunities they have to solve these through the adoption of regenerative agriculture. Some core topics revolve around incentives, organization, finance, alliances, infrastructure, species diversification, market access, food security, and food sovereignty.

Sourcing from Place

The role of sourcing from place as a key driving force for the evolution of regenerative agricultural systems: sourcing from indigenous/traditional/local knowledge, local (farmer) community centric development, working with the unique character of the landscape.



Nested Levels of RA Markets

Developing Markets for Ancillary Crops

The imperative to facilitate development of markets for secondary or ancillary crops. As RA is inherently a diversified system, increasing ecological and financial health can ensue from crop diversification, given that secondary crops can easily be brought to market.

The Role of Markets: Commodities, Local Markets, and Food Sovereignty

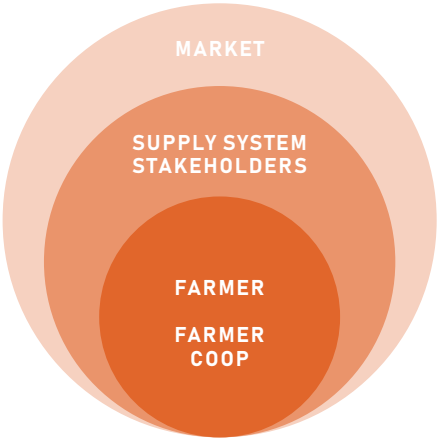
The unique challenges and opportunities that come with farming export commodity crops, farming for local markets, and subsistence farming; and the need to diversify across all three these realms of economic scale, making species diversification the basis for financial resilience, as well as food sovereignty

The Role of Data

The value of integrating technical solutions: data as a farm product can be a means to create more farmer equity, more farmer buy-in incentives, and better financial health. Furthermore, data and data aggregation can make it easier to manage and improve regenerative agricultural systems based on empirical findings and adjusting the system based on feedback.

Organizing Farmers

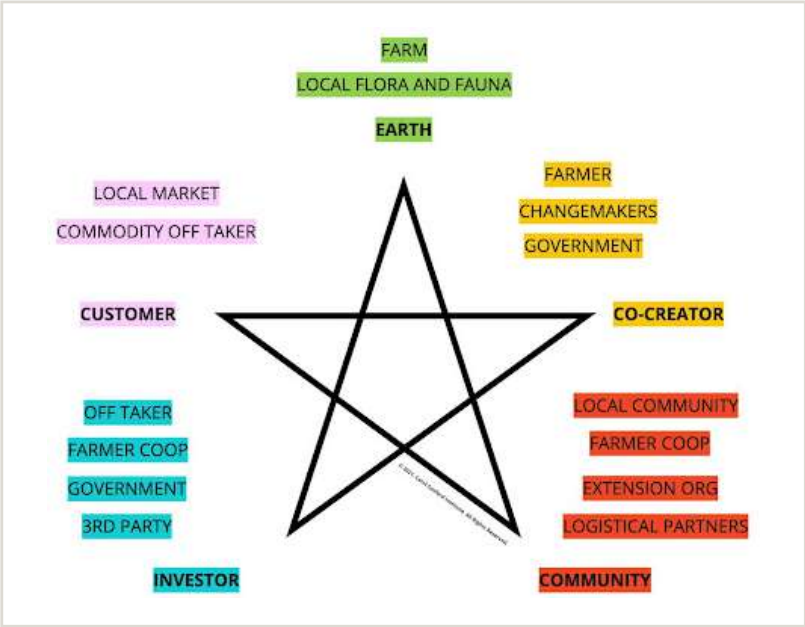
The importance of facilitating farmer organization in collectives or cooperatives: working together creates a community of learning, social acceptance and practical support in business operations, and importantly the aggregation of produce gives farmers a stronger market position as well as mitigating the risks of low yields or failed crops.



RA Nested Stakeholder Systems

Growing Multi-stakeholder Alliances

The pivotal role of supply system stakeholders and of forging multi-stakeholder alliances as a way to catalyze the development and evolution of regenerative agriculture: the ability to navigate local/national bureaucracy, and tackle the issues around local/famer community buy-in, financial risk mitigation through offtaker involvement, and (local) partners to cover areas like logistics, infrastructure, and technical support.



RA Supply System Stakeholders

The Challenge of Navigating Policy Environments

The issue of effectively navigating bureaucracy, policy, and regulations is an important component in all the regions discussed, and plays a critical role in growing and scaling RA. Important questions revolve around land tenure, agricultural policy, land use regulations, and working with officials on a local, regional, and national level. Oftentimes it requires expertise from a third party or direct collaboration with officials to facilitate the development of smallholder RA. Understanding the nuances and how to navigate the system is crucially important. Conversely, creating traction aimed at shaping policy is a possible top-down approach that in various contexts has yielded beneficial results as well. In most cases, knowing the right people and collaborating with the right parties can contribute significantly to project success.

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