

# Scaling Regenerative Agriculture in Tropical Regions

## Policy and Market-Based Solutions



### GROWING NEED FOR A SYSTEM SHIFT

An era-defining question is how agriculture can sustainably feed a human population expected to grow to 9.6 billion by 2050, while conserving biodiversity and mitigating climate change. Our current agricultural system generates 10 billion tonnes of greenhouse gases per year, equating to roughly 24 percent of total human made emissions. Agricultural systems are also driving 75 percent of deforestation to date<sup>1</sup> and are a critical threat to 86 percent of the 28,000 plant and animal species known to be at high risk of extinction.<sup>2</sup> Further reports have found that industrial agriculture uses as much as 70 percent of all freshwater withdrawals worldwide along with pesticides usage increasing by 80 percent since 1990.

Several global institutions, among them the International Panel on Climate Change (IPCC) and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES),<sup>4 5 6</sup> have stated that an agricultural transition to agroecological and regenerative farming practices is needed to address the climate, biodiversity, human health, and social crises we face today.

#### **Regenerative agriculture**

While the scope of the problems that we face are clear, there is a substantial amount of research that demon-

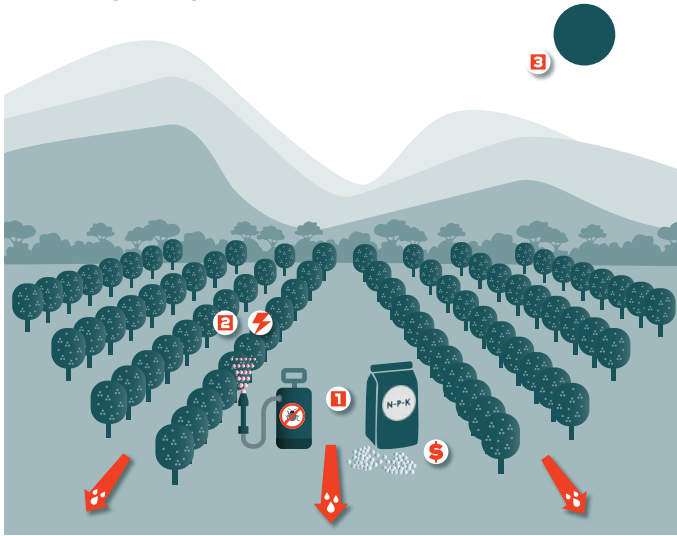
strates that solutions exist and there is a window for change. Regenerative agriculture, which has its roots in [indigenous practices](#), presents many solutions to the issues that have become prevalent in industrial agricultural supply chains. To remedy the problems we face, efforts need to be taken up quickly, in an integrated manner and at scale to address the root cause of global agricultural shortcomings.

Currently, there is no universal definition of regenerative agriculture. For the Rainforest Alliance, “regenerative agriculture” comprises a broad set of principles and practices under the umbrella of climate-smart agriculture. The Rainforest Alliance’s overarching vision of a regenerative farm aligns with the 10 Elements of Agroecology defined by the FAO<sup>7</sup> and the 13 principles of agroecology defined by the High-Level Panel of Experts (HLPE) of the Committee on World Food Security (CFS)<sup>8</sup>. Taking an agroecology and integrated system management approach, regenerative agriculture aims to increase biodiversity and enhance ecosystem services and farm resilience thus leading to resilient livelihoods and prosperous farmers. This way of farming is based on enhancing the inherent strengths of agroecosystems, ultimately enabling a reduction of external inputs (synthetic fertilizers and pesticides), and increasing farm net income by reducing costs.

**FIGURE 1**

The regenerative transition involves moving away from a model of farming where efficiency is prioritized over ecological health, towards a system where investing in the ecosystem rewards both people and nature.

**EFFICIENCY**



**EFFICIENCY**

Maximize yields by using:

- I** lots of agrochemicals,
- E** monocultures, and
- B** full sun.

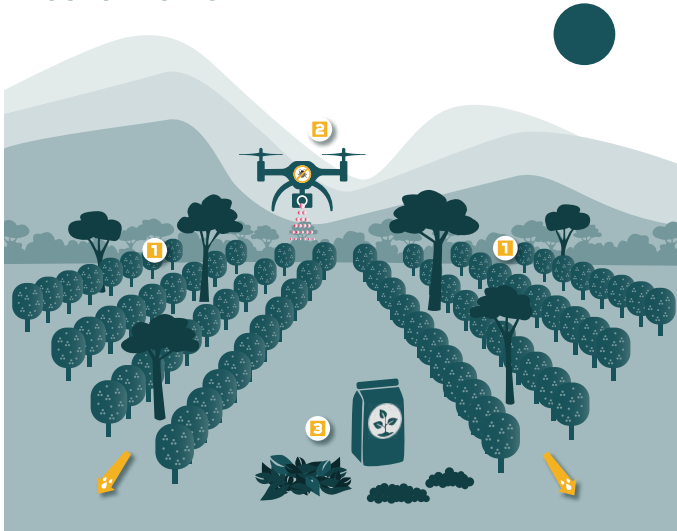
**⚡** Lack of plant diversity makes crops more vulnerable to pests and disease.

**↓** Poor soil health increases risk of erosion and run off. This can contaminate local bodies of water. It also makes crops more vulnerable to pests and diseases.

**\$** Synthetic fertilizers and pesticides are very costly.

- ↓** Soil Health
- ↓** Water Health
- Crop Health
- ↓** Biodiversity
- Resilience

**SUBSTITUTION**



**SUBSTITUTION**

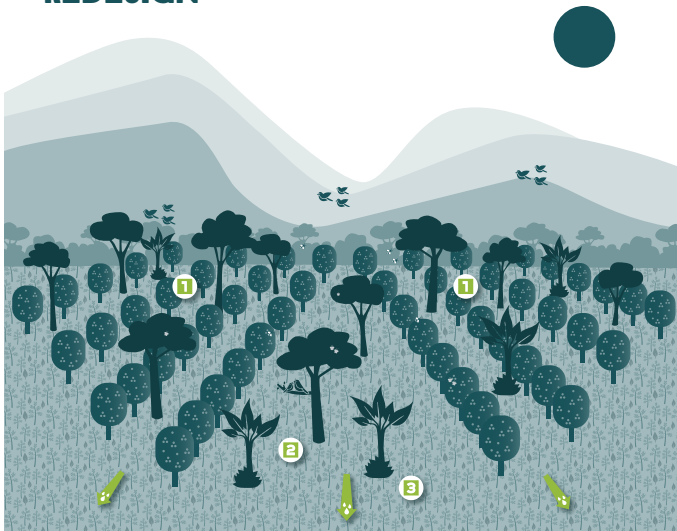
**I** Some plant diversification.

**E** Pesticides are still used but farmers use a targeted approach, minimize use, and swap for safer alternatives and/or biological controls.

**B** Farmers start to swap synthetic fertilizers with organic ones, mulch and compost.

- Soil Health
- ↑** Water Health
- Crop Health
- ↓** Biodiversity
- Resilience

**REDESIGN**



**REDESIGN**

**I** Shade and fruit trees are intercropped.

- shade trees provide protection and climate control,
- fruit trees and other crops attract birds and natural predators for pests. Fruit trees also serve as an alternative source of income.

Vegetation helps reduce water pollution, and filters run off. Vegetation also helps reduce attacks by pests and diseases.

**E** Cover crops suppress weeds, attract natural predators and pollinators, and give nutrients to the soil, reducing the need for chemicals.

- ↑** Soil Health
- ↑** Water Health
- ↑** Crop Health
- ↑** Biodiversity
- ↑** Resilience

**DEGRADING**

**REGENERATING**

## Practices supporting regeneration of farms

Regenerative agriculture should be understood as a process, that functions through stages that work through an integrated framework. Hence, regenerative agriculture is not a binary term, whereby farms are simply “regenerative” or “not”. We can, however, say which practices support regenerative ecosystems and which practices do not. One of the key principles of regenerative agriculture is to improve soil health, which means improving the soil’s chemical, physical, and biological properties. Practices that support this principle include adding organic matter, using cover crops and mulch to protect the soil, no-tillage, crop rotation, intercropping, and increasing plant diversity. Implementing these practices results in greater capacity for water retention and infiltration, as well as enhanced biological activity—all of which has a positive effect on nutrient availability and carbon sequestration. A healthy soil results in healthier crops that are resilient to pest and diseases, reducing the need for inputs such as fertilizers and pesticides. Reducing such external, often polluting inputs is another one of the key principles of regenerative agriculture as these chemicals undermine regenerative processes by harming micro-organisms in the soil, key pollinators and natural predators and parasites of pests. To reduce pesticide use, farmers take an integrated pest management (IPM) approach in which pesticides are used as the very last resource and under strict measures. When a farm reaches a mature stage of regenerative agriculture, there should be almost no external input in the farm.

Fundamental to regenerative farming is recognizing how to protect and restore the web of complex and mutually beneficial relationships that underpin healthy farms. On a coffee farm, for example, the relationship between shade trees and soil is vitally important: the trees provide shade from the burning sun, but also their leaf litter provides vital nutrients to the soil while serving as habitat for species that defend coffee trees against common pests and conserving soil humidity, reducing the coffee stress during the dry season.



*A capped langur on Lambari, a Rainforest Alliance Certified tea garde located in the hills of Arunachal Pradesh, India. Photo by Sandeepan Bhattacharjee*

## Regenerative Agriculture offers multiple wins

The benefits of regenerative agriculture have been identified as a viable solution – for policymakers and companies – to bring about positive social and environmental impact, while simultaneously offering a long-term business case to supply chains and farmers. The unique opportunities it offers are:

1. Greater crop resilience against extreme weather events caused by climate change. This adaptation to climate change is reached by improved soil health, conservation of habitats of natural predators of pests and improved water conservation.
2. Increased wellbeing for farmers, their families, and communities – as regenerative practices are proven to increase farmer income and their health – by limiting agrochemicals expenditure and exposure and diversifying income sources.
3. Climate mitigation through an increase of trees on the farm and an enhanced ability of the soil to sequester carbon. Strongly reducing agrochemical use will keep soil micro-organisms alive that play an important role in the carbon sequestration capacity of the soil.
4. Increased levels of biodiversity on and outside of the farm through the strengthened farm eco-system and the strongly reduced use of agrochemicals.

The Rainforest Alliance approach to regenerative agriculture aims to go beyond limiting the damage caused to nature by people and instead restore the balance between people and nature so they both thrive in harmony. We want to shift markets toward being net positive for people and nature by collaborating with millions of farmers and workers to shift incentives toward rewarding positive social, economic, and environmental impacts. By doing that, local communities become both the stewards and the primary beneficiaries of thriving landscapes. The Rainforest Alliance aims to support the communities that care for our most critical landscapes by accelerating and scaling up the social and market forces that protect, restore, and regenerate these ecosystems.

## CERTIFICATION

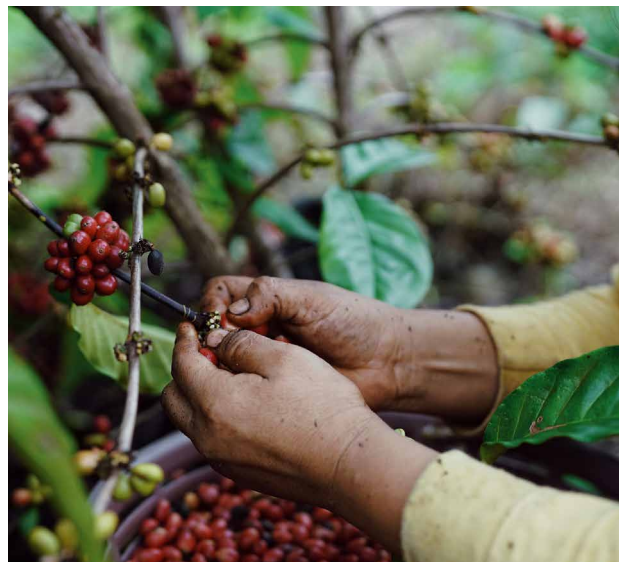
The 2020 Rainforest Alliance [Sustainable Agriculture Standard](#) can be viewed as our first intervention and provides a practical framework for sustainable agriculture alongside a targeted set of innovations to drive continuous improvement. The SAS provides the foundation for regenerative agriculture transition as the farm requirements provide direction for farmers to produce better crops, adapt to climate change, increase their productivity, achieve their sustainability performance goals and target investments to address their greatest risks. The Farm Requirements are designed to support certificate holders to maximize the positive social, environmental, and economic impact of agriculture, while offering farmers an enhanced framework to improve their livelihoods and protect the

landscapes where they live and work. The implementation of regenerative agricultural practices are important requirements in the Standard. Rainforest Alliance Certified farms are required to conduct soil testing and analysis to guide their inputs. The use of organic fertilizers is promoted by the standard as well as composting, crop rotation, integrated weed and pest management, cover cropping, promoting biodiversity, the maintenance of native and diverse vegetation and implementation of agroforestry practices. Our Sustainable Agriculture Standard also includes requirements aimed at improving the livelihoods and working conditions of farmers, farm workers and their communities, and measures for compensating farmers for their positive contribution to nature.

- **Soil health:** The foundation of a regenerative farm is healthy soil. Rainforest Alliance Certified farms are required to conduct soil testing and analysis to guide their inputs. Our Sustainable Agriculture Standard also promotes the use of organic fertilizers, composting, crop rotation, integrated weed management, and cover cropping, among other practices that improve soil health.
- **Promoting biodiversity conservation:** A flourishing ecosystem is a diverse ecosystem. Rainforest Alliance Certified farms promote biodiversity through the maintenance of native and diverse vegetation, implementation of agroforestry practices, protection of high conservation value areas (HCVA), and development of Integrated Pest Management (IPM) strategies.
- **Improved livelihoods:** Regenerative agriculture looks at the wellbeing of the entire farm's ecosystem, including the people who live and work there. Our Sustainable Agriculture Standard outlines critical protections for farmers and workers, activities aimed at improving the livelihoods and conditions of farming communities, and measures for compensating farmers for their positive contribution to nature.
- **Climate change adaptation and mitigation:** Conserving and restoring forests, enhancing biodiversity, and reducing on-farm greenhouse gas emissions through nature-based techniques makes farms not only more resilient to climate change, but a key tool in the fight against it. By implementing practices that protect and support a thriving ecosystem, certified farmers are also strengthening their local ecosystem services, such as flood resistance and carbon sequestration.

### Corporate partnerships

The Rainforest Alliance also establishes corporate partnerships to scale regenerative agriculture implementation. We implement various tailored services and corporate advisory projects to support companies' responsible sourcing commitments and ambitions. These business-led partnerships are specifically designed for companies that source from tropical supply chains to support farmers transitioning to regenerative agriculture on the ground in our key sectors; coffee, cocoa, tea, and palm oil. Businesses can speed up these transformations by investing in trainings for farmers, knowledge building in-kind payments and financially rewarding the implementation of regenerative practices.



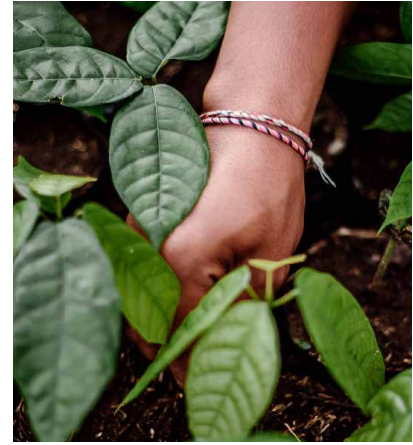
*A seasonal coffee picker on Finca Panorama in Guatemala picks red coffee cherries. Photo by Creagh Cross*

### Regenerative Scorecard

An important publicly available tool developed by the Rainforest Alliance to implement regenerative agriculture in supply chains is the regenerative scorecard. The regenerative scorecard offers both certified and non-certified supply chain actors a tool to assist their regenerative transition. It is a crop-specific, voluntary tool that builds upon the Rainforest Alliance Certification and provides a framework for transitioning to regenerative agriculture per crop based on practices. This framework, which is currently available for coffee, includes "bronze", "silver", and "gold" levels – allowing farmers and market partners to be clear on their current regenerative performance and understand the investment and resources needed to transition. By using a scorecard system, the Rainforest Alliance can highlight where targeted support is needed, track improvement towards regenerative goals, and recognize producers for transitioning to regenerative agriculture. While many frameworks in the industry focus on outcomes, the regenerative scorecard provides practical guidance by focusing on farm-level practices that supply chain actors can implement to achieve regenerative outcomes.

**The coffee scorecard was developed in collaboration with Nespresso** and builds upon insights gathered from research conducted on smallholder coffee farms in 2020. Building on tests conducted in Costa Rica and consultations from experts in Brazil, Colombia and other coffee producing regions, the scorecard identifies practices for specific contexts that mimic local ecosystems' innate regenerative functions. This reflexiveness allows farmers and technicians to identify a regenerative pathway that's both appropriate for their differing regional environments and in effect feasible for farmers to implement.

The Rainforest Alliance aims to develop regenerative scorecards for its main crops; with cocoa, palm, and tea scorecards to be published in 2024. These scorecards are also being developed with our company partners including Unilever, Barry Callebaut, Kirin Beverages, and Nestle.



*Improving soil's chemical, physical, and biological properties is a key component of regenerative agriculture.*

### **Thriving Landscapes**

Landscapes and communities are the third layer of our regenerative agriculture approach bringing all the land users together to discuss common interests and determine the path to restoring landscapes. By focusing on the landscape approach, the benefits of regenerative agriculture can extend beyond a single supply chain of a company's sourcing process and have a positive impact on a wider geographical area. The goal is therefore to converge the interests of **farmers, companies, communities, local governments, and NGOs** within a landscape to not just reduce negative practices, but to restore degraded forests, increase biodiversity, and enhance the local ecosystem's resilience. In partnership with institutional stakeholders such as **USAID, FCDO, the IKEA foundation, the United Nations' Global Environment Facility, the Green Climate Fund, and the Inter-American Development Bank**, the Rainforest Alliance is implementing landscapes projects across key sourcing regions. Many of our corporate partners are also engaged in landscapes projects, such as those included in our Integrated Landscape Management Program. Our current projects, that aim to use regenerative agriculture as a basis for landscape conservation and rehabilitation include:

#### *Ghana's Sui River Landscape*

The Sui River landscape in the Western North region of Ghana spans 244,000 hectares—including five forest reserves—and is one of West Africa's most important cocoa-growing areas. The Sui River landscape in Ghana is home to a thriving cocoa and timber industry. Through our partnership with **Olam International** and the **UK Partnerships for Forests**, the Rainforest Alliance assists 10,000 farmers in pursuing climate-smart and regenerative practices. This is achieved by:

- **Landscape Management Boards:** The Rainforest Alliance's Integrated Landscape Management approach supports rural communities to build self-sustaining, long-term, dynamic landscape partnerships with all land users—farmers, forest enterprises, local leaders, companies, and governments—to tackle the complex, interconnected challenges of regenerating degraded landscapes.

- **Climate-smart agriculture and diversifying rural livelihoods:** Farmers in the Sui River landscape are trained in climate-smart agricultural (CSA) practices to help mitigate the effects of increasingly severe weather patterns. This has equipped farmers with the skills to implement regenerative practices such as shade tree management, soil conservation, water management, and increasing resilience through livelihood diversification. Olam have directly supported these efforts by providing interest-free loans and technical support.
- **Restoration actions:** To restore degraded areas, shade trees were distributed to farmers. Between 2018 and 2021, over 200,000 seedlings (from seven native tree varieties) were raised by partners and community nurseries. These trees have been planted on fallow lands and cocoa farms to protect against adverse effects of climate change. To support those responsible for these forests and farms, the technical capacity of the Landscape Management Boards (LMBs) and local communities was expanded, allowing them to lead the way in restoration activities and subsequent management of the restoration of landscapes.
- **Tree registration activities:** Registering trees to legally claim them is an important goal for cocoa farmers, but the complexity of the tree tenure system and land ownership rights in Ghana pose a significant challenge. The capacity of 16 local tree registration enumerators was increased in the Western North region, directly leading to the registration of 1,000 trees.



*In Ghana's Sui River region, cocoa farmers have established nurseries to cultivate shade trees.*

The Mount Kenya Sustainable Landscape and Livelihoods Program running between 2020–2026 focuses on growing conservation efforts from small pilots to landscape-wide initiatives. The project is building on our earlier work in the region to bring communities, companies, government agencies, and institutions together to manage Mount Kenya's precious land and resources more sustainably through regenerative agriculture, while improving farmer livelihoods. Our research and experience at the Rainforest Alliance has shown us the value of an [Integrated Landscape Management \(ILM\)](#) programmes that bring all land users together to discuss common interests and determine collective actions. Partnering stakeholders include:

- **Smallholder farmers** - 25,000 smallholder coffee farmers and 25,000 smallholder tea farmers
- **forest-dependent communities:** 1,000 members of Community Forest Association (CFAs) and Water Resource Users Associations (WRUAs)
- **farmer cooperatives:** five tea factories and eight coffee cooperatives in Kirinyaga county
- **Government institutions, and civil society:** local governments, NGOs, community-based organizations, and schools within the landscape

The project aims to upscale the benefits of regenerative agriculture at the landscape level by working with farmers, government agencies, schools, and community organizations to advance the overarching rehabilitation of Mount Kenya's degraded forests. Particular attention is being paid to riparian strips (land alongside waterways on which vegetation and trees are planted) in both public and private areas.



*A member of the Njukini Community Forestry Association in their tree nursery in Mount Kenya. Photo by Joost Bastmeijer*

## BARRIERS TO IMPLEMENTING REGENERATIVE AGRICULTURE AT SCALE

Through our work on regenerative agriculture implementation, we regularly see how difficult it is for farmers to make the transition. They face many barriers: lack of finance to invest in alternatives, lack of support from both governments and buyers, aggressive marketing from the agrochemical industry to continue using synthetic pesticides, and even counter-productive measures from governments and buyers like supplying and subsidizing agrochemicals. They also regularly are influenced by the opinions of extension officers, agrochemical salespeople and other farmers telling them farming through regenerative practices and with less agrochemicals is impossible. In consequence, Farmers willing to transition to regenerative agriculture often have no access to financial incentives nor knowledge support. To implement regenerative agriculture at scale governments and supply chain actors need to align their own vision and strategies with a systems change to support farmers to overcome the barriers they face. These calls for company support to overcome barriers faced by farmers are even more pressing as FAIRR have indicated that 64 percent (32/50) of the agri-food companies that publicly report on regenerative agriculture as a necessary transition for food systems do not have any company wide quantitative targets to achieve this systems change. Similar reports have also indicated that only 8 percent (4/50) of these companies have financial commitments in place to support farmers in their supply chains to transition to regenerative agriculture.<sup>10</sup>

## HOW GOVERNMENTS CAN SUPPORT A TRANSITION TO REGENERATIVE AGRICULTURE

### *Achieving Sustainable Development through Regenerative Agriculture*

Governments are currently faced with several interconnected issues that stem from conventional agriculture such as climate change, biodiversity loss, food insecurity, and water insecurity. The way many governments try to address these issues is through the United Nations' sustainable development goals (SDGs). Regenerative agriculture incorporates many mutual goals through an integrated approach that can support sustainable development. For example, regenerative agriculture's emphasis on agroforestry models improves forest conservation (SDG 13), which naturally increases biodiversity (SDG 15). Maintaining production of crops through diversification supports local food security (SDG 2), and simultaneously supports farmers on the ground with resilient crops, contributing to climate mitigation and adaptation (SDG 13). Furthermore, regenerative agriculture's focus on reducing synthetic fertilisers ensures that local water systems are not polluted, contributing to life under water (SDG 14) and clean water for local communities (SDG 6). In a similar dynamic, preventing synthetic pesticides contributes to decent work (SDG 8) by preventing farmer poisonings and simultaneously leads to production of crops uncontaminated by toxic pesticides, contributing to good health and well-being (SDG 3).



*Community members gather and transport shade tree seedlings at a nursery in Ghana.*

Governments therefore have a central role in ensuring there is a system change that moves away from conventional agriculture and prioritises the interconnected nature of food systems. Regenerative agriculture holds huge potential to transform food systems and respond to some of the most pressing challenges of the Anthropocene era. The Rainforest Alliance is not alone in its efforts to implement regenerative agriculture; many farmers, NGOs, companies, and governments have already embarked on the regenerative agriculture journey, but still the transition has just begun. Much more action is needed, especially from governments. Farmers wanting to implement regenerative practices face policy barriers. They suffer from a lack of subsidies for organic fertilizers and biological pesticides and the absence of extension services supporting the implementation of regenerative practices.

### **Public Policies Conducive for a Systems Change to Regenerative Agriculture**

A shift in public policies is needed to enable the implementation of regenerative agriculture at scale. Which policies are most effective depends on a country's current agricultural system, main crops, climate, and culture. When assessing and developing policies that incentivize regenerative agriculture adoption, governments should address the following areas:

**Subsidies and taxes should be redirected to support regenerative agriculture.** Currently, conventional agricultural systems are producing rising environmental and health costs that are unaccounted for in the current market model. As a result, governments are facing mounting costs through public expenditure, with an estimated yearly environmental and social cost at \$6 trillion, equivalent to roughly 7 percent of the current global output each year.<sup>11</sup> Without redirecting the high costs associated with conventional agriculture, the costs are predicted to rise to \$11 trillion in the next 5 years as the impacts of climate change intensify. It is therefore essential that all subsidies and other economic incentives for conventional agricultural practices are stopped and redirected towards regenerative agriculture.

For example, subsidies for agrochemicals and extension services supporting monocultures should be phased out through high taxation that disincentivizes these practices. The funds that become available should then be shifted to measures incentivizing regenerative agriculture implementation, like the ones mentioned below.

- **Tax synthetic fertilisers, chemical pesticides, tilling and monocropping practices.** Pesticides are having a devastating impact on tropical supply chains. Without government intervention the issues will rise exponentially, as pesticides sales have increased 80 percent since 1990.<sup>12</sup> Studies on the impacts of pesticides in European agricultural landscapes have linked them with declines of more than 30 percent of field birds and meadow butterflies.<sup>13</sup> Annual pesticide usage in the USA alone is estimated to have the following negative externalities: US\$1.1 billion per year in public health costs, US\$1.5 billion in pest resistance, US\$1.4 billion due to crop losses caused by pesticides, US\$2.2 billion in bird losses due to pesticides, and US\$2.0 billion in groundwater contamination.<sup>14</sup>
- **Subsidies for biopesticides, organic matter as fertilizer, in-kind cover crops, shade trees and mulch to protect the soil** so that farmers do not incur too many costs when they transition to regenerative agriculture. These subsidies are most essential in the early stages of the transition as over time, regenerative farms require fewer external inputs, especially fertilizer, as soil organic matter increases. Indeed, studies have shown that a third of farmers' gross income goes toward external inputs on conventional fields, compared to 12 percent in regenerative fields.<sup>15</sup> These savings, combined with diversified incomes can ensure that farmers become self-sufficient after transitioning away from industrial methods.



*A great hornbill searches for food among the shade trees on the Hathikuli tea garden in India. Photo by Sandeepan Bhattacharjee*

**Funding widespread trainings on regenerative agriculture targeting smallholders.** Agriculture plays a fundamental role in tropical countries' total export earnings. Smallholders have a central role as they are responsible for 29 percent of global food crops, accounting for 80 percent of coffee production and 60 percent in tea. Governments therefore have a vested interest in reducing smallholders' vulnerability to climate change in order to maintain their export capacity.<sup>16 17</sup> The focus of smallholder support programs should be not on merely on yields but should include the profitability and viability for the farmer. To ensure smallholders are protected, governments should upscale regenerative agricultural practices through:

- **Farmer field schools (FFS)**, which is an approach developed by the [Food and Agriculture Organisation \(FAO\)](#) to provide contextual knowledge, using participatory, hands-on methods best suited to rural environments. This enables farmers – often with little formal education – to compare and assess different farming practices in their own fields and transition to practices that maintain ecosystem health.
- **Field extension officers** have been proven to support farmers in the uptake of farming with natural vegetation and forest patches, implementing agroforestry systems where pertinent, and establishing and maintaining riparian buffers (buffers beside rivers and streams) to protect aquatic ecosystems. Studies from Ghana have found that extension officers are essential for smallholders to understand the needs of their farm and gain knowledge on how to adapt to climate change.<sup>18</sup>
- **Easily accessible information on effective techniques** that can reach smallholders and ensure that dialogues on effective techniques are being discussed at the local level. Various creative ways to reach farmers such as posters, farmer to farmer learning, SMS texts and app chats have proven effective at providing smallholders with information on agricultural practices.<sup>19 20 21</sup>

**Using regenerative agriculture as a climate mitigation and adaptation strategy.** Conventional agriculture is responsible for an estimated 13 gigatons of CO<sub>2</sub> emissions per year, or roughly 22 percent of global GHG emissions. To significantly reduce emissions from farms and meet their NDCs, governments must quickly transform their agricultural systems by ending deforestation, preventing further forest and land degradation, reducing emissions from fertilizers, agrochemicals, and fossil fuel use in farming ecosystems. In effect, if implemented at scale, regenerative agriculture offers governments a mitigation solution by sequestering carbon through healthy soils, helping to accelerate a net zero agendas. Furthermore, transforming agricultural production to a regenerative one is critical for countries adaptation efforts, feeding into their NAP (National Adaptation Plans). Climate change has a disproportionate impact on agricultural communities worldwide, especially in tropical ecosystems. Extreme weather events such as rising temperatures and changing rainfall patterns are intensifying pest and disease outbreaks and causing water scarcity. Food security, livelihoods and income, agricultural production and supply chains are, in turn, highly impacted, disrupting local and national economies. Governments can deepen their climate mitigation and adaptation impact by using markets to incentivize these practices, supported by:

- **Geographic information systems** such as databases to collect and disseminate critical information on vulnerable areas at risks through changing rainfall patterns, floods<sup>22</sup>, heat stress and droughts.<sup>23</sup> Governments can then better support farmers with regenerative agriculture practices that can increase their resilience in these areas.
- **Reporting on progress towards the Paris Agreement.** Regenerative agriculture can prove instrumental in reducing countries' domestic carbon footprints. Currently, under the requirements of the Paris Agreement all Parties report regularly on their emissions and on their implementation efforts. Governments can use regenerative agriculture as a mechanism for farmers to improve soil health and reduce domestic GHG emissions.
- **Reporting on progress towards the Global Biodiversity Framework.** Regenerative agriculture is an effective mechanism to support countries obligations, specifically **target 7** aimed at reducing the overall risk from pesticides and highly hazardous chemicals by at least half including through integrated pest management, based on science, considering food security and livelihoods. Similarly regenerative agriculture can support **target 10** aimed at ensuring areas of agriculture and forestry are sustainably used with respect to biodiversity, including through a substantial increase of the application of biodiversity friendly practices.
- **Payment for ecosystems services (PES)** are voluntary, contractual agreements established between beneficiaries and service providers whereby service providers (i.e., farmers) are paid to implement practices that protect and/or enhance the ecosystem service in question. For example, governments can use PES in areas prone to climate change to incentivise farmers to reduce vulnerabilities to floods, droughts, and soil erosion.





*Cocoa farmers harvest their crop on a farm in Bali, Indonesia. Photo by IGN Andre Stiana*

**Governments can invest in regenerative agriculture to restore degraded landscapes.** Governments in tropical ecosystems are facing increasing issues of land degradation, food insecurity, water insecurity and climate change. This is leading to mass migrations of people seeking food and an increased intensification of desertification through agriculture practices that are deforesting large swathes of land. Regenerative agriculture – specifically agroforestry practices – have been proven to prevent deforestation but also to regenerate degraded land.<sup>24</sup> Furthermore, by embracing regenerative agriculture as a broad set of climate smart agriculture techniques, governments can begin to restore vast landscapes, through better water and soil management. It should be mentioned here that regenerative agriculture in and of itself, cannot restore entire landscapes, it will require a coordinated policy effort that also protect forests and reserve forests from agricultural activity. In effect, regenerative agriculture should be seen as an aspect of restoration projects focused on, lifting people out of poverty, preventing detrimental agricultural practices, and restoring ecosystem health. Governments can achieve this by funding projects and supporting farmers in degraded areas through:

- **Promoting soil conservation:** Regenerative farmers employ techniques such as cover cropping, crop rotation, terracing and minimum tillage to promote soil health. These practices help retain moisture, prevent erosion, and enhance nutrient cycling. This builds organic matter content of the soil, improving its water-holding which increases resilience against droughts and erosion, preventing the expansion of desert areas.
- **Upscaling erosion control:** Regenerative practices such as contour plowing, terracing, and the use of windbreaks help mitigate erosion, preserving the topsoil and preventing it from being blown or washed away.

- **Water management** can effectively prevent desertification. Regenerative agriculture utilizes techniques such as rainwater harvesting, mulching, and contour plowing to optimize water usage, improve soil moisture, and reduce runoff.
- **Encouraging farmers to protect biodiversity:** By promoting biodiversity, regenerative agriculture encourages the return of native plant species, insects, and wildlife. This restoration of ecological balance contributes to the prevention of desertification and the overall health of the ecosystem.

### **Examples of governments already implementing regenerative agriculture policy solutions**

There is no government that has already fully shifted its policies away from supporting conventional agriculture to incentivizing the adoption of regenerative practices. However, many have taken some steps:

- **Indonesia's Farmer Field School (FFS)** model introduced by the government's National IPM Program, which was very successful at promoting widescale adoption of IPM. Extensive evidence shows that this program enabled rice farmers to drastically reduce pesticide use and lower their production costs while increasing yields. However, when the program terminated, pesticide producers and traders renewed an aggressive marketing campaign, which led to a resurgence in pesticide use. This finding emphasizes the importance of continuous government support and funding for sustainable agriculture and reducing the influence of the agrochemical industry over farmers.<sup>25</sup>
- **European Union's approach to reducing pesticides** through the European Commission's announcement of two pesticide reduction targets as part to the Farm to Fork Strategy in May 2020. These are a 50 percent reduction in the use and risk of chemical pesticides and a 50 percent reduction in the use of more hazardous pesticides. Each year, the Commission will publish progress at European Union level towards meeting both targets.
- **Denmark's pesticide tax** is closely related to the goal of reducing the overall pesticide load. Effective from July 1, 2013, the law requires a differentiated tax on pesticides, according to the pesticides' level of impact on health, nature, and groundwater. Denmark is also actively promoting the scaling of organic agriculture, of which the practices to a large extent overlap with regenerative ones.<sup>26</sup>
- **China's restoration of a degraded landscape** was driven by subsidizing the transformation of 4 million hectares of overgrazed, dust blown land on [China's Loess Plateau](#) during the 1990s. The landscape restoration programme used regenerative agricultural practices to support the wider landscape restoration efforts. The project utilised regenerative agricultural practices that first aimed at ecological development through techniques such as cover crops, terracing and contour plowing to promote soil health. The second phase began by incorporating local farmers specifically through cash crops that used diversification

and crop rotation to ensure erosion was limited. The last stage scaled these practices to a landscape approach as more and more farmers recognized the effectiveness of these techniques. The project lifted 2.5 million people out of poverty by increasing farmers income 8-fold and reduced soil erosion by 70 percent – effectively restoring the ecological balance of a vast landscape which many considered to be irreparably damaged.<sup>27</sup>

- **India’s agroforestry approach for climate mitigation** has focused on a landscape approach since 2015 with the goal of increasing forests from 25 million hectares to 53 million hectares. This policy recognizes that over 80 percent of India’s farmers are rain fed smallholders with two hectares or less and are vulnerable to the impacts of climate change. The project therefore aims to increase the resilience of smallholder farmers, while contributing towards poverty reduction and increasing the productivity of smallholder farms.
- **Peru’s agroforestry approach to reduce deforestation and support smallholders.** Agroforestry concessions are an innovative legal provision introduced by the Forestry Law of Peru. They seek to reduce deforestation and promote restoration of previously cleared land – by formally recognising smallholders who have encroached on state forest land – requiring them to either establish or maintain agroforestry systems in already deforested areas. These concessions give smallholder farmers who encroached on state forest land before 2011 rights over the land and forest resources for a maximum of 40 years on the condition that they comply with the requirements.
- **India’s climate adaptation through Zero Budget Natural Farming (ZBNF)** implements a system that relies on preventing farmers from becoming entangled in debt through high costs for seeds, fertilizers, and other inputs. ZBNF focuses on reducing chemical and synthetic inputs in favor of beneficial soil microbes, mulching and better water management. Projections have estimated falling inputs costs, in higher yields

(by as much as 40 percent) and crops that are more resilient to climate change. Due to these benefits the government of Andhra Pradesh has subsidised trainings aimed at increasing the current 160,000 farmers practicing ZBNF to 6 million by 2024.

- **Bhutan is a frontrunner for climate mitigation by becoming the first carbon negative country in the world.** Bhutan has achieved this through a long tradition of conservation based on their sacred relationship with forests meaning Bhutan has more than 71 percent of its territory under forest cover. These efforts have been greatly enhanced by Bhutan’s climate smart forest economy that has created a regenerative and circular construction industry along with sustainably managed forest crops. To ensure that forests remain untainted by these agricultural practices, tandem policies have been put in place to support organic and agroecological farming. Currently Bhutan is 80 percent organic with the goal of 100 percent by 2030, supported by agroecological techniques close the gaps between traditional organic Bhutanese practices and complete food self-sufficiency and sovereignty.
- **Burkina Faso’s farmers that restored a deserted landscape:** led by Yacouba Sawadogo a small number of farmers without much finance, basic technology, and a lot of hard work. Over a period of 20 years, Sawadogo transformed 62-acres of abandoned barren scrubland into a lush and productive forestry zone. Methods included traditional techniques called “zail hole” and “cordon pierreux”<sup>28</sup> that maximise the use of limited water allowed the land to become arable again. Due to the success of the project Burkina Faso’s Ministry of Environmental Affairs has formally endorsed these techniques and provided a protective fence for the entirety of the reforested landscape. There is also the ambition of replicating these successes in the wider Sahel region, specifically Niger that has pledged to use these techniques to regreen 3.2 million hectares by 2039.<sup>29</sup>



*A trainer discusses sustainable farming techniques with cocoa farmers in Ghana.*



Collecting soil samples for analysis on a coffee farm in Brazil. Photo by Giuseppe Cipriani

**The Rainforest Alliance’ key recommendations for governments:**

- Governments must redirect economic flows away from conventional agriculture and towards regenerative agriculture. Specifically, by taxing practices known to reduce soil quality, harm the health of farmers and their communities, or decrease biodiversity. The newly available funds should be shifted to measures that subsidize farmers costs when implementing regenerative agriculture.
- Governments must invest in trainings and peer-to-peer learning, to scale up the resilience that regenerative agriculture offers farmers. By scaling up trainings that foster peer-to-peer trainings, farmers are more inclined to take up regenerative approaches as they learn from neighbouring farmers who they find more trustworthy. These trainings should focus on smallholder farmers, who are particularly vulnerable to climate change and make up a significant majority of the world’s coffee, cocoa, and tea producers.
- Scale up regenerative agriculture to reduce the negative effects of conventional agriculture and achieve targets set by the Paris Agreement and net-zero commitments. Set policies that connect regenerative agriculture with climate adaptation and climate mitigation strategies to measure the impacts.
- Support landscape approaches that use regenerative agricultural techniques, to protect and restore wider geographical areas. Frame government policies that can ensure farmers have a positive impact on forested landscapes while protecting local food systems.

**MARKET-BASED SOLUTIONS SCALING REGENERATIVE AGRICULTURE**

***Making supply chains climate resilient***

A fundamental question for all supply chain actors operating in agricultural commodities is, are the farmers we source from resilient to climate change? The issue is bound up in rising temperatures linked to changes in rainfall patterns, heat waves and droughts, which affect the maturity process of plants often leading to negative impacts on crop health and productivity. Rising temperatures are also affecting the frequency and intensity of pest and disease outbreaks, which along with soil degradation leaves farmers with less reliable harvest periods<sup>30</sup> and lower yields year on year. Naturally, these climatic changes have already begun to affect the price, volumes, and availability of key crops essential to businesses. Companies are however in a unique moment in time to mitigate and adapt for these eventualities. Helping farmers to adopt regenerative practices will strengthen ecosystems and make them more resilient against severe weather events, reducing shocks in supply chains.

***Implementing a holistic set of practices***

Despite the growing number of companies using the term “regenerative agriculture”, many organisations are misappropriating the concept. Achieving regenerative agriculture can be done in several ways, but it is essential to recognise that regenerative agriculture can only work through a holistic approach. In effect, supply chain actors that implement only a few regenerative practices without a holistic approach will be missing out on maximising their supply chain resilience and GHG reductions. Identifying how to maximise the positive returns of regenerative agriculture can be done in various ways, for example by working with the Rainforest Alliance approach on regenerative agriculture to measure impact. Furthermore, companies that are serious about regenerative agriculture must incentivize farmers by financially rewarding them for the implementation of regenerative practices.

Below are market-based behaviours that support the shift towards regenerative agriculture, highlighting the business case for this approach both in terms of resilient yields and farmer incentives:

**Companies can reduce the use of chemical pesticides and synthetic fertilisers in their supply chains.** One of the first ways to identify companies that are serious about regenerative agriculture is through a commitment to minimize chemical inputs. Overuse of synthetic inputs is known to erode soil, decrease key pollinators, reduce natural enemies of pests and reduce biodiversity. Regenerative agriculture, which includes reduced use of synthetic inputs, is linked to more resilient crops, healthier soils, clean water systems and increased biodiversity. Benefits for companies include:

- **Meeting legal requirements:** In light of mandatory legislation such as the German Supply Chain Act (2023) and the EU's Corporate Sustainability Due Diligence Directive (2024), companies are obliged to identify the most hazardous chemicals in their supply chains and support farmers in limiting risks to human health and local ecosystems. Implementing regenerative agriculture reduces the use of chemical inputs by bolstering ecosystem services and resilience. Companies can meet these legislative requirements by supporting farmers to implement these regenerative principles.
- **Communicating on ethical supply chains:** Consumers have become increasingly aware of the growing need for sustainable produce, and regenerative agricultural offers access to niche marketing.<sup>31</sup> Consumers are knowledgeable of the toxic effect of pesticides on their food and have been willing to pay more for agrochemical-free products.<sup>32</sup> Furthermore, farmer welfare is critical to consumer confidence; currently farmer poisonings are estimated at 365 million per year with many consumers questioning workers' rights and safety. Regenerative agriculture reduces farmers' exposure to highly hazardous pesticides by promoting nature-based alternatives.

**Companies need to ensure farmers are financially incentivized.** There is currently a great deal of pressure put on farmers to begin a transition towards regenerative agriculture, but little support is provided for them. The gap between implementation and calls for change can be traced back to a lack of market incentives for farmers to begin the process. For effective implementation of regenerative agriculture practices – that can become the new normal for business – it is essential that companies collaborate with financial investors, retailers, and certification schemes to decrease financial risks for farmers. The transition to regenerative agriculture will take time for farmers and can cause a temporary decline in production. However, in the long-term productivity potential can be maximized by increasing a crop resilience. Hence it is essential that companies provide farmers with a realistic market case for transitioning to regenerative agriculture, that prioritises farmer livelihoods.

- **Insuring crops supports loyalty to key crops:** Farmers generally employ a long-term outlook, with many of them hoping to pass the land onto their children. That said, farmers are also interested in growing crops least susceptible to climate change. Without financial support, farmers will begin to exit key markets and either focus on crops that are less susceptible to climate shocks or will focus on new industries altogether. By ensuring farmers' crops, companies can increase the likelihood that farmers will implement the essential changes needed to boost the resilience of supply chains.
- **Premiums will incentivize farmers to transition to regenerative agriculture:** Companies are already experiencing the effects of climate change with many key crops being negatively affected. These issues are also being felt by farmers; as harvests become less reliable, farmers' income is forecasted to fall. Premiums are therefore a win-win, whereby farmers can improve their livelihoods, while companies minimize the vulnerability of their supply chains to current and future climate shocks.
- **In-kind payments will mitigate climate risks:** Often farmers lack on-the-ground-knowledge to make the shift to regenerative agriculture. Companies can bridge this gap and avoid climate related risks, by providing in-kind payments (such as rust-resistant seedlings, insect traps, shade trees, organic fertiliser, and biological control agents) to farmers seeking to transition to low-input systems. Companies can support farmers with inputs and equipment to avoid the "sunk costs" that often acts as a barrier and incentivise farmers to start implementing regenerative agriculture on their farms.
- **Low interest loans for regenerative agriculture:** Agriculture financing programs should aim to reward farmers who meet specified environmental standards for regenerative agriculture. In effect tailored loan repayments, can reward farmers for implementing soil health practices and operating with an efficient level of N fertilizer, to incentivise wider uptake. These loans should make use of development finance institutions (DFIs) that can bridge the gap for smallholders in rural areas to access these loans.
- **Regenerative agriculture supports climate mitigation strategies.** Conventional agricultural practices hamper climate mitigation efforts. The production of synthetic fertilizers and pesticides cause significant amounts of greenhouse gas emissions, and many of them are also greenhouse gases themselves, some even many times stronger than CO<sub>2</sub>.<sup>33 34 35</sup> Synthetic inputs also kill soil organisms that are essential for sequestering carbon. Lastly regenerative agriculture increases the number of trees on a farm; hence it can support companies' climate strategies, especially in a context of Scope 3 emissions.

## Companies implementing regenerative agriculture approaches:

- **Nespresso is implementing holistic regenerative practices in their supply chains** through the Nespresso AAA Sustainable Quality Program, launched in 2003. The programme creates long-standing relationships with farmers and offers ongoing agronomist support aimed at empowering farmers to improve the quality of their crop and their farm productivity through regenerative agriculture. Nespresso also financially rewards the farmers efforts for sustainable beans by paying a premium price. Nespresso achieves this by buying from the same farmers year after year, giving them the security of a reliable, long-term partner. This helps them to build economic as well as environmental resilience, protecting their land and livelihoods for future generations.
- **Unilever have developed a comprehensive guide to support producers to implement regenerative agriculture** the guide has been used to ensure that farmers are given support on their journey towards regenerative agriculture and serve as test cases to other farmers that regenerative agriculture offers resilient crops in a changing climate. The results from 2022 have demonstrated that farmers can increase pollinators (127 percent), native plants (27 percent), while simultaneously reducing methane (76 percent), CO<sub>2</sub> (48 percent), nitrogen run off (14 percent) and pesticides (78 percent).<sup>36</sup> These findings are proving vital for Unilever to meet their net-zero commitment by 2039, 11 years ahead of the 2050 global target.
- **Alaya Tea is phasing out synthetic pesticides and fertilisers**, providing a great example for many companies seeking to transition towards regenerative agriculture in their supply chains. In practice, Alaya Tea are proving that companies that care about the soil that grows their key crops start by reducing chemical pesticides and synthetic fertilisers. They're demonstrating that the best way to start a regenerative agriculture journey is to eradicate the synthetic pesticides and fertilisers that are depleting soil health and pollinators.
- **Keurig Dr Pepper are aiming to have a net positive water impact with support from the water resilience coalition.** This is being achieved through an in-depth analysis of areas vulnerable to water insecurity across their value chain that has been verified by geographical spatial information. These findings have been used to inform interventions aimed at vulnerable producers to maintain local water quality and reduce intensive water practices in these areas. KDP have pledged to improve water efficiency by 25 percent by 2025, utilising regenerative agricultural techniques that have been proven to increase water retention in soils. KDP is aiming to apply regenerative agriculture techniques to 250,000 acres of land by 2030 representing 50 percent of their climate sensitive crops.
- **Alter Eco support for agroforestry:** this B Corp created a foundation, which has allocated US\$1.5 million to help farmers pursue agroforestry where cacao is grown amongst a diversity of crops, and ideally, under the canopy of a forest. About 400 of their 1800 cacao farmers in Ecuador have already made the transition; another 1400 remain, which Alter Eco will support in the coming five years with funding, educational tools, and training.
- **Unilever AXA and Tikehau Capital are working to increase carbon storage, biodiversity, and water quality through regenerative agriculture.** The fund has an initial \$300 million investment with the goal of raising up to US\$1 billion from a range of actors. The fund assigns specific metrics and values to soil health, crop resilience, water protection and biodiversity. The fund has assigned US\$120 million to reduce dependence on conventional pesticides. It will achieve this by connecting farmers, producers, manufacturers, retailers, technology providers and financial investors with biopesticide technologies.
- **Kering and Conservation International are restoring landscapes in Argentina, India, Mongolia, and South Africa.** The Regenerative Fund for Nature that launched in 2021 seeks to transform agricultural practices by sourcing raw materials such as leather, cotton, wool, and cashmere from producers that are restoring soil and ecosystems, protecting biodiversity, and improving community livelihoods.
- **The Landbanking Group have created a new equity class for nature** that enables producers and suppliers to cash in on sustainable supply chains. In effect, regenerative agriculture can allow suppliers to award financial incentives to its producers for transitioning to regenerative agriculture. Furthermore, the positive environmental impacts can be registered and shared with legislators and investors to increase transparency. As the Landbanking Group put it, Nature delivers services to the global economy worth US\$140 trillion per year. For free. She needs a better bank.
- **The Environmental Defense Fund have developed a low interest loan scheme for farmers implementing regenerative agriculture.** The loans work on the basis of measuring the impact of the farm through soil health, efficiency of N fertilizer, water quality and crop resilience. Based on their findings farmers are rewarded with an incentive equal to a 0.5 percent reduction in their operating loan interest rate. These metrics are tailored to continually offer reductions based on continued improvement of regenerative agriculture practices.
- **Rabobank have pioneered Acorn to support smallholder farmers access carbon credits through agroforestry.** This project is aimed at farmers in Latin America, Africa, and Asia specifically in rural contexts. Therefore, there emphasis is overcoming the unique obstacles smallholders face including lack of proximity to physical financial institutions and reliance on informal economic flows. By teaming up with local partners this scheme has a better understanding of local contexts of agroforestry and a presence to ensure financial flows end up with the farmer. These schemes are developed with a model designed to ensure 80 percent of the financial payouts end up with smallholders ensuring that the real benefits are for the farmers.<sup>37 38 39</sup>



*Coffee seedlings are prepared for planting on a farm in Chiapas, Mexico.*

**Our key recommendations for companies in food supply chains:**

**Adopt public supply chain commitments** that require implementation of a holistic set of regenerative agriculture practices: organic inputs, intercropping, shade practices, water quality and soil conservation practices. Ensure that supply chain commitments are measurably increasing water quality, biodiversity, soil health and provide a clear roadmap with annual targets for a full transition.

**Financial incentives or in-kind payments** (such as pest-resistant seedlings, insect traps, and biological control agents) to support farmers transitions. This helps with the necessary investments during the initial implementation of regenerative practices and provide a financial buffer from any short-term volatility in yield and income that may result from changes in practices. These financial incentives should also cover any loss of earnings due to labor intensive regenerative agricultural practices.

**Support and set up research and implementation programs on regenerative agriculture.** This could include collecting and disseminating critical information on pilot testing of emerging best practices, as well as research on resistant cultivars and biological control agents, development of new technologies such as drone monitoring, soil health testing, remote forecasting, and pest identification through DNA barcoding.

**Elevate regenerative agriculture on government agendas** by voicing support for public policies that incentivize regenerative agriculture such as subsidies for organic fertilizers and biopesticides and regulating pesticide sales and use. ♻️



*A member of Guatemala's Mam indigenous community displays the group's nursery in Cajolá, Quetzaltenango. Photo by Sergio Izquierdo*

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The Rainforest Alliance is creating a more sustainable world by using social and market forces to protect nature and improve the lives of farmers and forest communities.

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