



# Investing In Resilience:

## A Blended Finance Approach to Farm Renovation and Improved Prosperity

Advanced Draft Prepared for the R&R Innovation Forum  
November 2015



## Contents

Executive Summary .....	3
Introduction .....	12
A Collaborative Approach for Building Smallholder Resilience .....	16
Financing Coffee Renovation .....	19
Leveraging Private Sector Investment for Technical Assistance .....	29
Looking Ahead .....	34

## Appendix - Tools

Enterprise Financial Fundamentals Diagnosis Tool.....	35
Internal Credit System Diagnostic Tool.....	36
Producer-Level Agronomic Performance Indicators .....	38
Enterprise-Level Agronomic Performance Indicators.....	40

# Executive Summary

After years of underinvestment in agriculture, the pendulum is beginning to swing back. National governments, donors, and multilateral institutions are now recognizing that investing in agriculture is critical to achieving the interrelated goals of poverty alleviation and food security. Meanwhile, consumer demand for sustainably produced commodities is growing rapidly, and companies are investing in their supply chains in ways that deliver shared value for all.

## The Canary in the Coal Mine

At the same time, climate change is becoming a source of significant additional risks for agriculture and food systems, taxing already overstretched resources. Researchers confirm that climate disruptions to agricultural production have increased over the past 40 years and are projected to further increase over the next 25 years.<sup>1</sup> Hundreds of millions of farmers — and the processors, traders, and retailers that link them to consumers — must now adapt.

For the past three years, a debilitating crop disease named coffee leaf rust has spread throughout Latin America. Known as “la roya” in Spanish, this naturally occurring fungal disease attacks coffee plants and kills them over time. It has dramatically reduced yields and caused significant economic losses for smallholder households and rural communities from Mexico to Peru.

Leaf rust has revealed the consequences of underinvestment in the coffee sector, not just in Latin America but also globally, and highlighted the vulnerability of participants throughout the entire supply chain, especially smallholder producers. It also underscores trends in other perennial crops and in smallholder agriculture more broadly — from depleted soil and aging plant stock to limited agronomic knowledge and insufficient access to inputs and finance. In that sense, the outbreak is a symptom of much larger, chronic problems facing farming communities globally.

Although the financial impact of leaf rust has yet to be quantified, during the height of the outbreak in early 2013, analysts estimated that over 50 percent of the total coffee-growing area in Central America had been affected, costing producers approximately \$500 million in lost revenue and eliminating an estimated 375,000 jobs.<sup>2</sup>

The outbreak has had a severely negative ripple effect on the region’s economies, prompting governments to declare national states of emergency, and global traders and roasters to search for ways to support producers and avoid potential supply disruptions. Public and private sector actors alike were reacting in real time but had limited visibility into the magnitude of the challenge. And few, if any, organizations had interventions that could meet the urgency and scale of what has now become the most severe leaf rust outbreak since the disease first appeared in the region three decades ago.

Leaf rust is not a short-term problem, and there are no quick fixes to overcome the epidemic. Output from coffee plants affected by the fungus is significantly reduced, which means that farm incomes are depressed precisely when farmers need cash to control and combat the disease. Plus, without active and ongoing management, aging plants coupled with poor farming practices creates an environment that is even more susceptible to pest and disease attacks. This, in turn, starts a downward cycle of low productivity, reduced income, and underinvestment that often leads to migration, deforestation, and other desperate measures.

Looking ahead, many are now questioning the long-term viability of coffee production in certain regions. Climate scientists predict that the area available to grow quality Arabica coffee will shrink, as warmer temperatures mean that lower-altitude

<sup>1</sup> Hatfield, J., et al. 2014. “Climate Change Impacts in the United States: The Third National Climate Assessment.” In U.S. Global Change Research Program, edited by J. M. Melillo, Terese (T. C.) Richmond, and G. W. Yohe: 150–74.

<sup>2</sup> International Coffee Organization (ICO), “Report on the Outbreak of Coffee Leaf Rust in Central America and Action Plan to Combat the Pest,” May 13, 2013.

production zones are no longer suitable for a crop that thrives in cooler conditions. While some coffee farmers may be able to shift to higher, cooler altitudes, others have no place to go.

This scenario will likely repeat itself in other agricultural value chains. Climate change has the potential to both positively and negatively affect the location, timing, and productivity of farming systems at local, national, and global scales. Many regions will experience declines in crop output because of diseases, droughts, pests, and other climate change induced stresses.<sup>3</sup>

Leaf rust is the proverbial “canary in the coal mine” signaling the impact of climate change on agricultural production. And, importantly, there is a large gap between the latest climate models and cutting-edge crop science of today, and the decision-making processes farmers go through when considering whether to replant disease-infected trees (and what variety to use), switch to another crop, or abandon their land.



<sup>3</sup> U.S. Global Change Research Program, 2014 National Climate Assessment.

## Building More Resilient Agricultural Supply Chains with Blended Finance

Root Capital is a specialized agricultural lender that has been financing small and growing businesses throughout Latin America and sub-Saharan Africa since 1999. As the effects of the leaf rust outbreak became apparent in early 2013, we hurried to develop a response. To address both the urgent financing needs of smallholder coffee farmers fighting leaf rust and longstanding barriers to on-farm investment, Root Capital leveraged existing relationships with public, private, and non-profit partners to launch the Coffee Farmer Resilience Initiative (CFRI).

Working through local enterprises, such as producer organizations and private mills, that aggregate smallholders, the multi-pronged approach channels short- and long-term financing as well as technical assistance to coffee farmers. A core component of initiative is providing credit to help producers finance the upfront cost of renovating and rehabilitating (R&R) diseased, aging, or otherwise unproductive coffee plants.<sup>4</sup>

Blended finance refers to the deliberate use of funds from capital providers that operate with a range of financial and impact return expectations, from philanthropic capital with a negative rate of return to those seeking market-rate returns. Generally, blended finance approaches are used to attract more capital towards investments delivering impact in emerging and frontier markets.

Figure 1: Coffee Farmer Resilience Initiative Activities

Finance	Advisory Services	Impact & Learning
<ul style="list-style-type: none"> <li>• <b>Short-term lending</b> for working capital needs and to finance continued investments in farm inputs and on-farm labor</li> <li>• <b>Long-term lending</b> to finance the rehabilitation and renovation of aging and diseased trees</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Financial training</b> so enterprises can qualify for and effectively manage credit</li> <li>• <b>Technical assistance</b> to promote climate-smart production and encourage adoption of improved farming practices</li> <li>• <b>Income diversification training</b> at both the enterprise and producer levels</li> <li>• <b>Mobile technology services</b> to help producer organizations digitize processes and modernize their operations</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Impact assessment</b> to understand the role that Root Capital lending and training have on agricultural enterprises and the impact that these organizations, in turn, have on individual producers</li> <li>• <b>Knowledge sharing</b> to document and capture challenges, progress, and learning to contribute to scalable models</li> <li>• <b>Market engagement</b> to demonstrate practical models for investing in sustainable supply chains</li> </ul>

### Box 1. Defining Renovation & Rehabilitation (R&R)

**Rehabilitation:** Grafting, stumping or pruning to rejuvenate diseased, aging or otherwise underproductive trees.

**Renovation:** Entirely replacing diseased, aging or otherwise unproductive trees with new seedlings.

<sup>4</sup> CFRI countries include Guatemala, Honduras, Mexico, Nicaragua, and Peru.

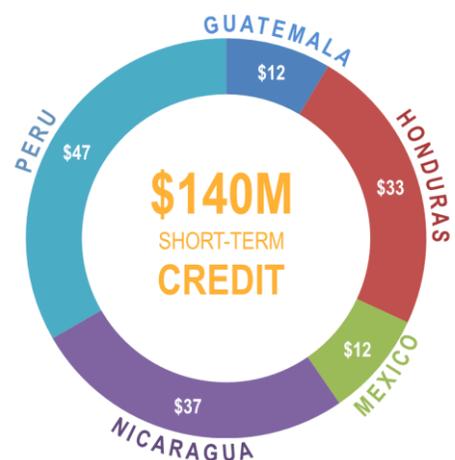
## SHORT-TERM LENDING

Under CFRI, we aim to reach — through either direct lending or advisory services — at least 50 producer enterprises representing an estimated 40,000 farmer households and 200,000 family members.

This includes a plan to provide by 2017 at least \$165 million in short-term loans to participating businesses to address their working capital needs and finance equipment or other capital expenditures. These loans facilitate market access and stabilize cash flows so that producers can continue to generate income from coffee trees that have not been affected by leaf rust. Most, but not all, of these loans are made against forward purchase agreements or letters of intent with buyers. In most instances, this avoids the need for fixed-asset collateral, which can be time-intensive to register and, more importantly, is often not available.

Within the first two years of the initiative, we have disbursed over \$140 million in short-term credit to 115 coffee enterprises representing more than 100,000 farmers across the five countries.

**Root Capital Financing**  
November 2013 – November 2015  
(USD, Millions Disbursed)

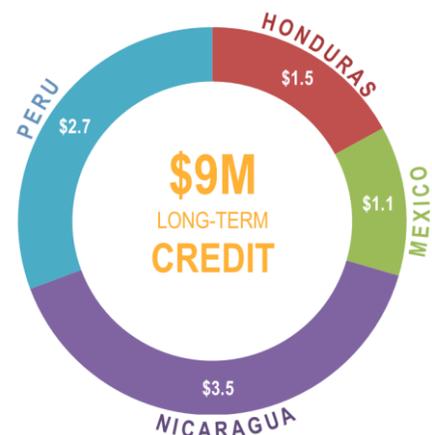


## LONG-TERM LENDING

For those businesses that have been affected by leaf rust, we aim to provide \$15 million in long-term loans for R&R while also providing these and other enterprises with financial management training and agronomic assistance so they can qualify for and responsibly manage long-term credit. Within the first two years of the initiative, we have approved \$9 million in long-term renovation loans to nine enterprises. These loans are helping 1,335 smallholder coffee farmers renovate 3,500 hectares of land under cultivation.<sup>5</sup>

While these loans comprise a material portion of Root Capital’s overall loan portfolio (just under 10 percent), and therefore represent a substantial risk exposure relative to our balance sheet, they address a minute fraction of the underlying demand for R&R in the region, let alone globally. A recent analysis by Dalberg finds the global need for coffee-sector R&R at roughly three million hectares, which carries an approximate cost of \$6.3 billion within the first year and then \$35 billion over the course of 25 years. The same report identifies similar financing needs in the smallholder cocoa, palm, and tea sectors totaling an additional \$14 billion today and \$74 billion over the next 25 years.<sup>6</sup>

**Root Capital Financing**  
November 2013 – November 2015  
(USD, Millions Approved)



## TECHNICAL ASSISTANCE

In addition to the significant funding required to conduct R&R — average renovation costs range from \$3,000 to \$5,000 per hectare — enterprises accessing loans on behalf of their affiliated farmers must have the necessary accounting and internal control systems as well as the requisite technical agronomic knowledge.

Therefore, as part of CFRI, Root Capital delivers financial advisory services to managers and accounting staff of both potential and existing clients, with the goal of strengthening the capacity of these businesses. In some cases, this involves supporting clients in using mobile technology to digitize and improve farm-level monitoring. We also coordinate with third-party agronomic

<sup>5</sup> The cost of R&R is often complemented by internal funds from coffee enterprises and/or farmers themselves.

<sup>6</sup> Dalberg, Smallholder Tree Crop Renovation and Rehabilitation: A Review of the State of the Emerging R&R Market and Opportunities to Scale Investment,” October 2015.

advisors, local universities, and government partners to help clients develop and implement R&R plans built on sound, climate-smart agronomic practices.

With aging trees and declining yields, Latin America’s coffee-growing regions required large-scale investments in R&R well before the outbreak of leaf rust. With the sudden spread of the disease, there is now a broader recognition of this fact and a willingness to make long-term investments in sustainable production. Nevertheless, we have learned that doing so is challenging and requires new and often unprecedented levels of collaboration across sectors. It also demands a blend of below-market capital and well-targeted subsidy as well as a continuing commitment from donors and investors. Successful models for conducting large-scale coffee R&R remain limited to that of Colombia’s Federación Nacional de Cafeteros (**See Box 9**), with piecemeal yet promising measures in other coffee-producing counties now taking shape.

## What We’re Learning

In an effort to contribute to the dialogue around blended finance approaches to R&R specifically, and investing in smallholder agricultural more broadly, this report shares details of the public-private partnership model Root Capital developed, what we’ve done over the first two years of the initiative, and what we’re learning. Drawing from existing literature and on-the-ground observations from Root Capital loan officers, financial trainers, and agronomic advisors, as well as our partners in the initiative, the report offers five practical recommendations for conducting R&R at scale.

**Figure 2: Summary of Recommendations**



1. **Leverage blended finance structures and incorporate smart subsidies to finance R&R.** While there is now unprecedented interest in agricultural investing, private markets have generally failed to deliver financing for smallholder R&R, and for smallholder agriculture more broadly. Given the risks inherent in agriculture, coupled with the limited availability of adequate insurance and hedging products in these markets, the cost of commercial capital over a seven-plus year time horizon would exceed what most smallholder farmers can afford. It is therefore unrealistic to expect that smallholder R&R can be financed on purely commercial terms and deliver risk-adjusted returns to investors.

Rather, we believe that for R&R to happen at scale with smallholder farmers — whether in coffee or other tree crop value chains like cocoa — a blend of capital with different risk/return expectations and impact objectives, as well as smart subsidies for accompanying technical assistance, is required. When designed and implemented in ways that align incentives, mechanisms such as partial loan guarantees, risk-sharing facilities, reserves for first-loss capital, and technical assistance funds can mitigate risk and expand impact. This type of targeted subsidy, if further scaled, can also help lower barriers to entry for other lenders and mobilize capital from a range of sources.

2. **Identify and strengthen scalable aggregation points for channeling capital to smallholders.** The vast majority of the world’s smallholder farmers — estimates suggest up to 90 percent — do not participate in tightly organized value chains.<sup>7</sup> Rather, they are unorganized and lack strong, consistent relationships with buyers — as well as limited access to finance, farm inputs, agronomic training, and other support services that often accompany those relationships.

Even within the coffee sector, which is generally considered among the most organized and transparent agricultural value chains, a majority of the world’s 25 million producers are not aggregated into formal enterprises. For instance, there are an estimated 220,000 coffee farmers in Peru, which has among the most developed coffee sectors of the 20 countries in which Root Capital works, but only 30 percent of them are affiliated with some type of organization.<sup>8</sup>

To date, Root Capital has delivered renovation financing to farmers almost entirely through aggregators, including producer organizations, private mills, and exporters. Delivering credit through these channels helps to partly overcome common barriers to rural finance (e.g., the high transaction cost of reaching individual farmers directly) and mitigate some of the risks associated with R&R lending. But this approach inherently limits our reach, and we know that there is substantial need for farm renovation among the broader population of smallholder farmers. In fact, smallholders who are not affiliated with an aggregator may be the most-affected and highest-need.

New channels are needed to efficiently deploy capital to smallholders beyond those connected to well-organized producer organizations and private enterprises. Opportunities exist to disburse capital through local microfinance institutions, savings and loan cooperatives, traders and exporters, and commercial banks. For instance, under CFRI, Root Capital provided financing to Crediflora, an agricultural-focused savings and credit cooperative in Peru that is on-lending credit to help approximately 125 producers to renovate rust-affected coffee trees.

**Figure 3: Distribution Channels**



However, institutions like Crediflora that have a combination of financial and agronomic expertise are rare. When these distribution channels do exist, they are inherently limited by the risk appetite of the aggregator. Developing risk-sharing mechanisms in which aggregators assume part but not all of the risk on the performance of loans they deploy and manage could increase the addressable demand by an order of magnitude. We believe this offers a promising avenue for future product development and innovation.

3. **Expand risk management solutions to benefit individual producers.** As coffee growers recover from leaf rust and are confronted with a decision of whether and how much to invest in R&R, they do so amidst an increasingly volatile coffee market. After surging 50 percent in 2014, the futures price of Arabica retreated to less than \$1.20 per pound — its lowest level in 20 months — and now hovers only slightly above Central America’s estimated average cost of production. At the same time, meteorological reports warning of exceptionally strong El Niño conditions through 2016 are provoking further uncertainty, with potential disruptions to the timing and volume of rainfall in several coffee-producing countries.

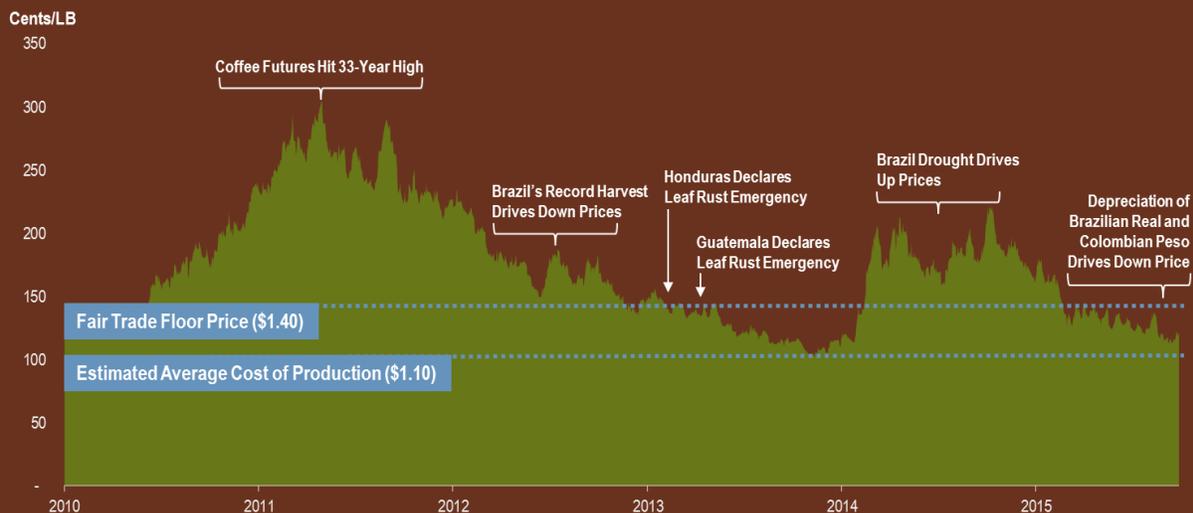
<sup>7</sup> Dalberg, Catalyzing Smallholder Agricultural Finance, September 2012.

<sup>8</sup> Peru Ministry of Agriculture and Irrigation, presentation by Juan Manuel Benites Ramos at the 2015 Specialty Coffee Association of America annual conference.

This is the context in which smallholder coffee producers are deciding whether or not to make 10-plus year investments in their farm: what may appear to be a smart, rational decision to invest one year, may prove otherwise the next. In the case of one Root Capital borrower, the number of hectares that producers were renovating using their own funds dropped by 80 percent from 2014 to 2015 as the global benchmark price for coffee fell to their current lows. And despite the extent to which both public and private sector actors have embraced the concepts of resilience and sustainability, it is the producers who still take on a disproportionate share of the risks. They remain most vulnerable to and least able to cope with shocks and stresses and the boom-and-bust price cycles that often follow.

Therefore, in addition to focusing on increasing production, policymakers and practitioners should devote equal attention to designing and deploying effective risk management solutions that are both accessible and applicable to farmers and farmer enterprises. This can include early warning systems — such as the one recently established in Honduras by IHCAFE and others — and crop insurance schemes to protect farmers from downside risk, especially in times of natural disasters and widespread crop failure. In addition, specialty buyers whose business is linked to specific flavor profiles and origins can incentivize and reward quality with price premiums and long-term contracts that partly insulate farmers against market volatility.

## Box 2. Arabica Futures Price Since 2010 – New York “C” Price



While this report does not directly address current price volatility, we include the topic here to remind readers of the complex and constantly evolving market in which farmers and coffee enterprise managers are deciding whether or not to undertake R&R investments. Note that coffee enterprises that conduct renovation with their affiliated farmers typically do so only after a period of several months of agronomic and financial preparations — during which time the market price may fluctuate in ways that dramatically increase or decrease demand for renovation financing from the farmers. Thus, market volatility introduces additional complexity to an already myriad of challenging decisions.

4. **Bundle financial and non-financial support to increase the absorptive capacity of enterprises and individual farmers to qualify for and manage credit.** Because aggregators — cooperatives and private exporters in Root Capital’s experience — are the conduit through which financing reaches individual producers, the success of any renovation investment will ultimately be determined by the strength of the aggregators’ management systems. Yet more often than not, lack of capacity, limited technical knowledge, and weak internal controls at the aggregator level become the biggest bottleneck to scaling renovation financing. For this reason, it is critical to bundle credit with demand-side agronomic assistance and financial advisory services. This support can significantly lower transaction costs for loan underwriting while reducing risks for borrowers and lenders alike.

To date, much of Root Capital's advisory services have focused on strengthening producer organization's internal credit system (a micro-loan fund managed on the enterprise's balance sheet for the benefit of its affiliated farmers). Generally, these internal credit funds are designed to provide small, short-term loans to producers in order to smooth otherwise lumpy and seasonal cash flows. With capacity building to ensure appropriate internal controls and loan monitoring, internal credit funds can offer long-term loans for renovation, although doing so entails additional risks that must be well-managed.

Similarly, because many rust-affected farmers are reluctant to take on multi-year financial commitments in the current context of extreme market volatility and unpredictable growing conditions, more advanced decision-support tools are needed to remove the guess work and help producers objectively evaluate potential financial returns. This includes robust cost-benefit analyses to determine the financial viability of renovation as well as detailed yield projections that are informed by climate scenarios mapped at various altitudes and with different production systems.

For smallholder farmers and the enterprises that aggregate them, it is rarely the case that both capital and technical assistance are available. Bringing the two together is essential for expanding the addressable demand for R&R finance, as well as for reducing risk and incentivizing financial institutions to invest responsibly.

5. **Strengthen the overall enabling environment by ensuring consistent access to high-quality planting material and information about coffee varieties.** Experts urge growers to carefully consider several aspects of their production system when selecting an Arabica coffee variety for renovation: altitude, hours of sunlight, and shade management, among others. The decisions farmers make about which varieties to plant could likely impact their livelihoods for the next 20 years or more. However, decision-making is often incidental rather than strategic. And coffee farmers rarely have enough information to make choices based on what is optimal for their local conditions.<sup>9</sup> Today, limited information and a lack of consensus on varieties presents one of the most formidable challenges to successful renovation.



*A Nicaraguan coffee cooperative used geo-information to map coordinates of its members who are renovating. The above map illustrates the incidence of leaf rust among those producers.*

Recent sensory trials conducted by Catholic Relief Services in collaboration with the International Centre for Tropical Agriculture (CIAT) and World Coffee Research (WCR), found that while there are differences in flavor between the Catimor and Caturra varieties, there are no significant differences in the overall quality.<sup>10</sup> (This is especially important in the rapidly growing specialty coffee sector, where licensed graders evaluate attributes beyond just flavor, including acidity, body, balance, and fragrance, to arrive at a score that often translates to significant price premiums paid to enterprises and producers). Despite these recent findings and an ongoing focus on improving coffee quality, the debate over relative merits between rust-resistant and non-rust-resistant varieties continue, leaving many farmers with mixed messages.

Meanwhile, quality control at the seedling production phase has been inadequate. Farmers often produce their own seedlings, typically with poor results, and many of the nurseries run by coffee enterprises on behalf of their affiliated farmers are not well-managed. Seemingly small and easily overlooked details, such as the origin and quality of coffee tree seedlings, make a significant difference in the success of a renovation program. In some cases in Peru, we have found up to one-third of seedling mortality after transplantation to the field, mostly due to root problems originated at the nursery stage. In other cases, nurseries mistakenly mixed seedling varieties. Farmers may not realize these mistakes until a year or more after planting. These and related quality-control issues not only increase the cost of renovation but also reduce productivity and depress farmer incomes, thereby jeopardizing loan repayments.

<sup>9</sup> Neuschwander, Hanna, "The Importance of Research and Investing in the Future," *Specialty Coffee Chronicle*, October 30, 2015.

<sup>10</sup> Catholic Relief Services, 2015 Presentation on Colombia Sensory Trial

There is an immediate need for more coordination throughout the value chain as well as varietal recommendations for farmers and enterprise agronomic teams; some of this is well-underway thanks to ongoing work by WCR through its Coffee Variety Intelligence project. This research is essential in providing alternatives to traditional coffee varieties.<sup>11</sup> Alongside variety research, R&R initiatives must place a strong focus on technical training, capacity building, and transparent reporting related to nursery management and seedling production.

## Looking Ahead

It is likely that leaf rust and other crop diseases will affect producers for years to come. And the unpredictable weather conditions that come with climate change will further jeopardize their ability to cope with pests and pathogens. Indeed, leaf rust is just *one* crop disease threatening producers in *one* value chain in *one* region.

While there are no quick fixes to these challenges, we are seeing some encouraging signs of progress — from well-managed renovation plans to innovative income diversification projects — across our lending portfolio of 115 coffee enterprises representing approximately 100,000 farmers across Latin America. At the same time, we're also seeing many cases of farmers simply waiting to see what happens to their coffee trees, or abandoning their land in desperation and migrating to work elsewhere.

This document seeks to share our learning — progress and challenges alike — from the first two years of the Coffee Farmer Resilience Initiative. While modest in scale relative to the overall need, we hope that the initiative can provide insights to inform emerging models for building farmer resilience and prosperity in the coffee sector as well as in other agricultural sectors in which smallholder farmers play a crucial role (*e.g.*, cashew, cocoa, maize, palm oil, tea). The report is divided into four sections and concludes with practical tools and templates used by Root Capital to finance long-term renovation and rehabilitation.

- **Section I. Introduction:** The report begins by providing brief context on the global coffee market and the rise of leaf rust disease.
- **Section II. A Collaborative Approach for Building Smallholder Resilience:** This section explores the design and funding sources of this multi-stakeholder initiative. It discusses the range of interventions used to promote resilience and highlights implications for aligning diverse actors to work on a larger scale.
- **Section III. Financing Coffee Renovation:** This section delves into how Root Capital structures long-term loans for renovation and rehabilitation, outlining the due diligence and monitoring required. It also breaks down the estimated cost of renovation and discusses the critical role of internal credit funds in channeling finance through aggregators to individual farmers.
- **Section IV. Leveraging Private Sector Investment for Technical Assistance:** The report concludes by exploring the complementary role that technical assistance plays alongside the provision of credit in renovation and rehabilitation investments. It does this by highlighting the mechanism within CFRI through which private sector roasters and traders have channel investments into their own supply chains to support agronomic training, mobile technology adoption, and a range of income diversification activities.

<sup>11</sup> World Coffee Research, "Why Genetic Diversity Matters," July 2015.

# Introduction

Produced and exported from more than 50 countries and enjoyed by millions, coffee is among the world’s most valuable traded agricultural commodities. Its cultivation plays a crucial role in the livelihoods of 25 million coffee farmers and their families, not to mention those involved in other steps along the value chain: farm inputs, harvesting, processing, transport, roasting, and retail.

For decades, millions of these small-scale farmers have struggled to earn a stable income due to often interrelated challenges of depleted soil; erratic weather; limited agronomic knowledge; and insufficient access to inputs, technology, markets, and financing. Compounded by the impact of crop diseases, these factors are in large part responsible for the pervasive “yield gap” in smallholder coffee production — and in smallholder agriculture more generally — that inhibit farmer productivity and prosperity. That is, while farmers in Colombia, the world’s second-largest producer of Arabica coffee, achieve average coffee yields of 900 kilograms per hectare, farmers in Nicaragua realize average yields of 600 kilograms per hectare and those in Tanzania produce just 300 kilograms per hectare.<sup>12</sup> Worse, coffee yields in many countries have been steadily declining due to aging plants and chronic underinvestment.

Still, many farmers and other participants in agricultural value chains have traditionally thought of perennial crops such as coffee as a long-term, lower-risk annuity that yields steady and reliable dividends each season. And for years, the industry has tended to focus on the variability of coffee *prices* — an important issue to be sure and one that should not be forgotten in this discussion — rather than declining *productivity*.

This dialogue has recently evolved; production risk on the farm is now seen as being just as important as price risk in the marketplace.<sup>13</sup> As extreme weather events become more frequent with climate change, zones suitable for crop production shift, and pests and diseases affect aging plants, the issues that constrain productivity and farmer prosperity — and discourage younger generations from following their parents into farming — are now being noticed by industry, policymakers, researchers, and the international development community.



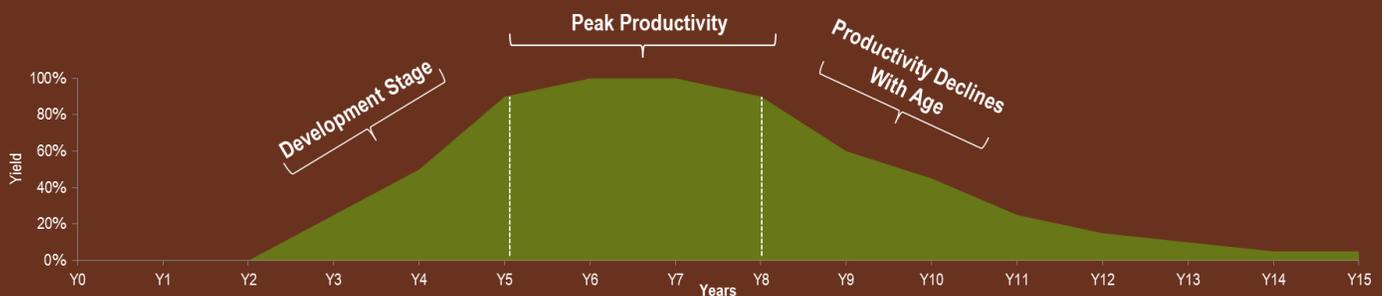
<sup>12</sup> International Coffee Organization, 2015.

<sup>13</sup> Sheridan, Michael, “Coffee Rust: What’s Below the Surface?” CRS Coffeelands, April 24, 2014.

### Box 3. The Productive Lifespan of Coffee

Coffee is a perennial crop that, much like wine, is greatly affected by soil, temperatures, rainfall, and various other climatic factors. For this reason, only countries located in the equatorial “coffee belt” offer suitable growing conditions and specific altitudes required for producing Arabica and Robusta coffee.

Coffee plants are long-term assets that become less productive as they age. On average, it takes about three years from the time a seedling is planted for it to bear fruit. After five years, coffee plants reach full productivity. From this point, until the tree is about 15 to 20 years old — barring any incidence of diseases or pests and assuming the consistent application of good agricultural practices — it produces fruit, with yields generally beginning to decline in years 8 to 10 and falling over time. However unlike wine, there is no economic value or quality attributes that come from “old growth” coffee plants.



In order to maintain healthy and productive plants, investment in ongoing maintenance and periodic renewal is required. In an ideal production system, it is recommended that farmers strategically rehabilitate sections of their farms each year, typically 5-10 percent depending on the life cycle of the specific variety in that particular production zone, as opposed to pruning all trees at once. This approach minimizes income losses as small blocks are gradually taken offline on a rotational basis. Even though farmers are rehabilitating a percentage of plants each year, overall production increases over time because existing plants are more healthy and productive. For smallholder farmers, this also means more consistent cash flows.

However, without this type of active and ongoing management, aging plants coupled with poor farming practices creates an environment that is more susceptible to pest and disease attacks. This, in turn, starts a downward cycle of low productivity and low income and, as a result, farmers are unable to invest in their land.

In Honduras, for instance, 60 percent of coffee trees are older than 20 years.<sup>14</sup> And the average age of coffee plants in El Salvador is 50 years old.<sup>15</sup> Meanwhile, it is estimated that more than 50 percent of coffee trees in regions of Eastern and Central Africa are over 50 years old.<sup>16</sup> With aging trees and minimal investment in farm rejuvenation as the status quo, the consequences of droughts, severe disease outbreaks, and other shocks become even worse.

14 Sheridan, Michael, “Overheard at the First International Coffee Rust Summit,” CRS Coffeelands, April 2013.

15 Morales, Juan Jose, “Antigüedad de Cafetales Incidió en Daños Por,” El Salvador, March 26, 2013, <http://www.elsalvador.com/articulo/negocios/antiguedad-cafetales-incidio-danos-por-roya-31124>.

16 Neuschwander, Hanna, “The Importance of Research and Investing in the Future,” Specialty Coffee Chronicle, October 2015.

## The Rapid Rise of Roya

Coffee leaf rust is a naturally occurring fungal disease caused by the air-borne pathogen *Hemileia vastatrix*, which comes from the same family of rusts that affect staple crops like corn and wheat. It attacks coffee plants by covering their leaves with yellowish-brown dust-like spores, diminishing the plant's ability to photosynthesize and store energy. This process reduces yields and can kill plants entirely — sometimes within a matter of weeks.



The disease is believed to have originated in East Africa, where it was first discovered in 1861. Over the following century, leaf rust spread throughout Africa and Asia, where it famously destroyed the coffee industry in present-day Sri Lanka. In 1970, it was discovered in Brazil and is now present throughout much of Latin America.<sup>17</sup>

Although leaf rust has existed in coffee-producing countries for decades and is present in some areas during every season, serious outbreaks have been rare. Traditionally, the disease has only affected coffee trees planted in more humid areas at lower altitudes. Many farmers controlled it sufficiently by using fungicides. However, in late 2012 the disease spread to new areas and to unusually high altitudes, from southern Mexico to Peru. With more than half of Central America's total coffee-growing area affected, the epidemic has been the worst seen since leaf rust first appeared in the region three decades prior. During the height of the outbreak in early 2013, analysts estimated that leaf rust could reduce the region's annual output by up to 40 percent, costing producers approximately \$500 million in lost revenue and eliminating nearly 400,000 jobs.<sup>18</sup> As a result, the governments of Costa Rica, Guatemala, Honduras, Nicaragua, and Peru all declared national states of emergency.

The situation caught many coffee farmers, buyers, researchers, and policymakers off guard, and it jeopardized decades of work to strengthen the coffee value chain and improve producer livelihoods. Questions began to emerge about the future availability and quality of coffee as well as the long-term viability of its production in Latin America. Would the benchmark price of coffee — which remained below \$1.50 throughout 2013 during the outbreak due to a record 2012/13 harvest in Brazil — offer farmers enough incentive to make such long-term investments in their land? Or, would leaf rust drive smallholder farmers out of coffee growing and into other crops, or out of agriculture entirely?

Almost three years after the initial spread of leaf rust, its impacts are more visible as are the potential solutions. In some countries, rust-related losses were not as drastic as had been feared, yet in other countries the disease took an unexpectedly devastating toll. In El Salvador, for example, leaf rust cut production by 60 percent in 2013/2014 compared to a year earlier.<sup>19</sup>

Even within countries, incidence and severity of leaf rust were uneven. In Peru, 40 percent of total coffee-growing areas have been affected by rust, but the disease hit much harder in the central part of the country than it did in the north.<sup>20</sup> For instance, some producer organizations with which Root Capital works in the Selva Central region experienced 80 percent drops in production due to leaf rust.

17 Schieber, E. and G.A. Zentmyer. 1984. Coffee rust in the Western Hemisphere. *Plant Disease*. 68:89-93, 1984.

18 International Coffee Organization (ICO), Report on the Outbreak of Coffee Leaf Rust in Central America and Action Plan, May 13, 2013.

19 International Coffee Organization, 2015.

20 USDA FAS, 2015. Peru Annual Coffee Report.

## The Canary in the Coal Mine

Across Latin America, leaf rust has revealed the effects of decades of underinvestment in agriculture. It is also the proverbial “canary in the coal mine” signaling the impact that climate change will likely have on crop production and, in turn, on the livelihoods of smallholder farmers. In that sense, the outbreak is a symptom of a much larger problem for farming communities.

More broadly, aging plants that are increasingly vulnerable to pests and disease and result in declining yields are now common across many value chains. For example, in Ghana, where diseases like black pod have ravaged cocoa production, an estimated 23 percent of cocoa tree stock is more than 30 years old, according to the country’s cocoa board.<sup>21</sup> When combined with coffee, palm oil and tea, the cost associated with R&R in these four value chains exceeds \$100 billion over the next 25 years.<sup>22</sup>

### Box 4. Coffee in the Age of Climate Change

Scientists predict that climate change will dramatically affect coffee production, particularly the more sensitive, high-quality Arabica variety. In the short term, increasingly frequent or severe weather events, such as droughts and floods, heat waves, and tropical storms will reduce yields, jeopardize quality, and increase pest and disease incidence.

Looking further ahead, by 2050 scientists predict the area available to grow quality coffee will shrink. The International Center for Tropical Agriculture (CIAT) concluded that current coffee-producing regions will likely experience severe reductions in land suitable for coffee.<sup>23</sup> Researchers predicted average declines on the order of 20 and 30 percent for the Andes and Central America, with higher losses in certain countries. These findings were reaffirmed in a more recent study commissioned by World Coffee Research suggesting that there will be a 50 percent reduction in global land area suitable for Arabica production by 2050.<sup>24</sup>

It might take several decades to see the full effects, but changing climatic conditions are already impacting coffee production. A recent study, for example, found that a warming trend over the last several decades has reduced coffee productivity in Tanzania. The same study estimated that every 1°C rise in night time temperature will result in yield losses of roughly 140 kilograms per hectare, cutting in half the country’s average yields per hectare by 2060.<sup>25</sup>

In some cases, coffee farmers may be able to shift to higher, cooler altitudes. In many regions, however, higher land is not available and farmers simply have no place to go. In addition to helping coffee producers invest in renovation and rehabilitation, some coffee-producing countries are implementing adaptation strategies to help farmers diversify beyond coffee. For example, the Honduran government recently announced plans to help farmers convert 20 percent of the country’s total coffee-growing land for cocoa production over the next few years, taking advantage of rising consumer demand for chocolate in emerging markets and cocoa’s ability to thrive in warmer conditions.<sup>26</sup>



**“It feels like a scourge from God,” said Nicolas Pineda.**

Nicolas Pineda is a member of the Montaña Verde coffee cooperative in Honduras. He has farmed coffee for two decades, selling premium-quality beans to international buyers through the cooperative.

The last time leaf rust struck hard in Honduras was during the 1980s, and Nicolas Pineda watched his father lose the family farm. Undeterred, he himself decided to get into the coffee business, only to find history possibly repeating itself.

Over the past two years, the 2.5 hectares that Nicolas cultivates have been hit hard by leaf rust. While some coffee trees were only partially affected, many have been destroyed.

21 Francis Kofi, Francis K., “Ghana’s Efforts at Sustaining Cocoa Production,” Presented at the International Cocoa Organization’s Cocoa Market Outlook Conference, 2015.

22 Dalberg, “Smallholder Tree Crop Renovation and Rehabilitation: A Review of the State of the Emerging R&R Market and Opportunities to Scale Investment,” October 2015.

23 Ovalle-Rivera O, Läderach P, Bunn C, Obersteiner M, Schroth G (2015) Projected Shifts in *Coffee Arabica* Suitability Among Major Global Producing Regions Due to Climate Change. *PLoS ONE* 10 (4).

24 Bunn, Christian, Läderach, Peter, et al., “Multiclass Classification of Agro-Ecological Zones for Arabica Coffee: An Improved Understanding of the Impacts of Climate Change,” *PLOS One*, October 27, 2015.

25 A.C.W. Craparo, et al., “Coffee Arabica Yields Decline in Tanzania Due to Climate Change: Global Implications,” *Agricultural and Forest Meteorology*, Vol. 207, July 2015.

26 Reuters Africa, Honduras To Replace Nearly 8 Percent of Coffee Land with Cocoa,” August 28, 2015.

# A Collaborative Approach for Building Smallholder Resilience

The leaf rust outbreak highlighted the critical need for new models to tackle environmental shocks and stresses, which are likely to become increasingly frequent and severe due to climate change.

## Mobilizing Partners and Resources

After participating in an emergency summit to discuss the impacts of leaf rust that was convened by PROMECAFE and World Coffee Research in April 2013, Root Capital began mobilizing partners from across the public, private, and non-profit sectors to co-design the Coffee Farmer Resilience Initiative.

To respond rapidly to the leaf rust outbreak, we leveraged our existing relationships to design and then launch the initiative six months later. A benefit of this approach was that we were able to respond relatively quickly; a drawback is that we had limited engagement with national governments and other public sector agencies in affected countries that, in the long term, will need to be involved in setting policies that facilitate R&R investment at greater scale.

Figure 4: CFRI Partners



The initiative is funded with a blend of below-market rate capital (*i.e.*, long-term loans with an expectation of a modest financial return that, on average, is between 2 to 2.5 percent per annum), catalytic credit enhancements, and grant funding.

- The Ford Foundation, Inter-American Development Bank (IDB), and Starbucks Coffee Company made a combined \$12.5 million in long-term investments (7-10 years at below-market rates) in Root Capital to support R&R-related lending.
- The coffee roaster Keurig Green Mountain and the U.S. Agency for International Development (USAID) each provided credit enhancements: Keurig Green Mountain's in the form of first-loss capital of \$400,000, equal to just under 3 percent of target credit disbursements, and USAID's in the form of a 50 percent *pari passu* guarantee up to \$15 million (*i.e.*, USAID absorbs \$0.50 of the loss for every dollar not repaid by eligible borrowers after the \$400,000 in first-loss coverage has been used).
- USAID committed \$2 million in grant funding under the Global Development Alliance (GDA), a mechanism designed to mobilize funds from the private sector. Three leading specialty coffee roasters — Cooperative Coffees, Equal

Exchange, and Keurig Green Mountain — provided a \$2 million match to channel funding for technical assistance directly to their suppliers through an accompanying fund.

- Support from other donors — including the DOEN Foundation, Open Road Alliance, and the Skoll Foundation — along with additional funding from IDB and Keurig Green Mountain covered costs associated with program design; financial management training, agronomic capacity building, income diversification, and mobile technology activities; and impact assessment efforts.

Each of these partners operates with different motivations and perspectives:

- Public sector institutions seek to overcome barriers to economic development and food security while efficiently addressing systemic issues of conflict, migration, environmental deforestation, and a host of other critical challenges;
- Private sector partners have a commercial need for a reliable supply of high-quality coffee and have also articulated an ethical interest in contributing to social and environmental impact; and
- Philanthropic partners have specific development and impact objectives as well as motivations to convene new cross-sector models.

While there is substantial common ground at a philosophical level, reconciling diverse priorities within a single partnership has proven challenging at times on a practical level. For instance, both USAID and IDB were interested in collaborating with global coffee buyers to help ensure the long-term sustainability of this work. They required the private sector to co-invest so as not to subsidize corporate supply chains themselves and stipulated that funds be used where development needs were greatest. Conversely, individual companies were hesitant to commit funds to a general pool that would address an industry-wide problem and, instead, pushed for their contributions to be earmarked to their specific suppliers.

We recognized from the outset that the involvement of national governments, agricultural research organizations, and industry promotion entities is critical for financing farm renovation at scale, both for coffee and for other commodities — as demonstrated in Colombia during an earlier leaf rust outbreak (**See Box 9**). We are now engaging more proactively with these stakeholders, such as the Junta Nacional del Café in Peru, and we look forward to deepening our relationship with similar organizations moving forward.



## Box 5. Financing the Rural Missing Middle

Root Capital is a specialized agricultural lender that seeks to grow rural prosperity in emerging markets in Latin America, sub-Saharan Africa, and Southeast Asia. We were founded on the understanding that investment in agriculture is one of the most powerful forces for reducing global poverty while also addressing interrelated challenges such as food insecurity and environmental degradation.

We make loans, deliver financial training and related advisory services, and strengthen market connections for small and growing businesses that build sustainable livelihoods and transform rural communities. Typically, these enterprises aggregate hundreds to thousands of farmers and are trapped in the “missing middle” — *i.e.*, too large for microfinance, but unable to secure credit from commercial banks.

We lend these businesses the cash they need to sustain and expand operations, and we accompany their growth over time. We also partner with them to build managerial capacity so they can effectively and responsibly use the capital that we or others provide. By working with a range of enterprises — from rural farmer cooperatives to privately owned exporters — we strive to address financing and knowledge gaps and crowd in other capital providers to develop a sustainable and inclusive financial market.

In 2014, Root Capital issued \$178 million in loans to 279 agricultural enterprises in Africa, Asia, and Latin America. Fifty-three percent of these enterprises were structured as farmer-owned associations or cooperatives, and 47 percent as private businesses. Coffee was the primary crop for half of the enterprises, with the remainder working in various export or domestic value chains, including cocoa, cashew, fresh or processed fruits and vegetables, staple grains, and dairy. Collectively, these businesses sourced from 441,000 smallholder farmers managing 672,000 hectares of land. That same year, our team provided financial training and facilitated agronomic training to more than 250 small and growing businesses, evenly divided between current and potential lending clients.

Root Capital raises both senior and subordinated debt investments from foundations, corporations, accredited individual investors, socially responsible investment firms, and religious institutions. We pool this capital together and on-lend it to businesses that stabilize and improve incomes for farmers and employees. The interest and fee revenue from our loans cover the majority but not all of the operating costs of lending in these underserved markets; philanthropic contributions cover the difference, strengthen our balance sheet, and fund our financial management training and impact and learning initiatives, such as the development and dissemination of this report.

Since launching in 1999, Root Capital has disbursed \$900 million in credit to more than 550 enterprises that collectively aggregate 1.2 million smallholder farmers. Borrowers have repaid 97 percent of these loans.

# Financing Coffee Renovation

With aging trees and declining yields, Latin America's coffee-growing regions required large-scale investments in renovation and rehabilitation well before the outbreak of leaf rust.

## Responding to a Billion-Dollar Fungus

Leaf rust is not a short-term problem, and there are no quick fixes to overcome the epidemic. The fungus impacts coffee trees immediately and can reproduce several times in a single crop cycle. Once leaf rust strikes, a farmer has one of four options:

- **Do nothing:** With limited income to combat the fungus and uncertainty about its causes and potential severity, many producers take a “wait and see” approach. Some stay on the land and continue farming, while others abandon farming altogether, migrating to urban centers to work in non-farm sectors.
- **Apply fungicide:** Those with the financial resources and technical expertise may decide to apply fungicide as a short-term solution to control leaf rust. Copper-based fungicides are most common and can be effective in reducing the likelihood of outbreaks. However, these fungicides are costly, have short periods of effectiveness, must be timed carefully, and can be detrimental to the environment.<sup>27</sup>
- **Rehabilitate:** Some producers have decided to graft, stump, or intensively prune diseased trees, followed by the application of recommended fertilizer and other inputs. Typically, only about five inches of the original coffee tree trunk remains, with its roots still in place. In addition to systematic pruning, rehabilitation activities include weed control, soil fertilization, and fumigation.
- **Renovate:** The most costly option, and the primary approach among current Root Capital clients under CFRI, renovation involves replacing diseased trees with new seedlings, often of a more productive variety that is adapted to the agro-ecological region and/or resistant to leaf rust and other pests and diseases. To avoid leaving farmers entirely without income, coffee tree renovation is typically conducted on a staggered, rotational basis. That is, coffee trees are cleared and seedlings planted on a portion of a farmer's land each year over the course of several years. Ideally and independent of coffee leaf rust, farmers would renovate 5 to 10 percent of their coffee trees annually so that they are replacing aging trees before productivity substantially declines from its peak and the trees become more susceptible to diseases. However, in the context of coffee leaf rust affecting the majority of a farmer's trees, as has been the case for many of the coffee enterprises Root Capital supports, farmers are renovating a much higher portion of their land — typically 20 to 35 percent. This higher percentage translates into larger financing needs and elevated risk for farmers and agricultural enterprises taking out loans to make these investments as well as for lenders like Root Capital issuing the loans.

<sup>27</sup> Kubota, Lily, “Some Insights on Coffee Leaf Rust (*Hemileia vastatrix*),” SCAA Chronicle, February 15, 2013.

## The Cost of Renovating

The availability of accurate, comprehensive, and comparable data on the true cost of renovation — from seedling production to transport to planting to maintenance — is limited. Nevertheless, we have identified some broad parameters in our loan portfolio that are consistent with what other peers and practitioners report; we share these below with the caveats that cost figures can be materially influenced by local factors, especially labor wages.

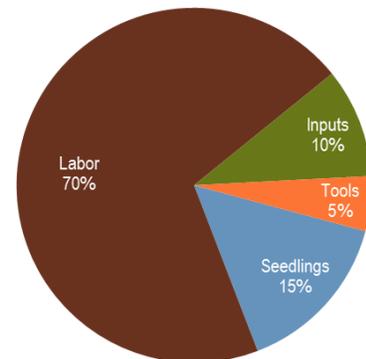
Because output from trees affected by leaf rust is significantly reduced, farm incomes are depressed precisely when farmers are in most need of cash to control and combat the disease. In addition to technical knowledge and labor, renovation requires significant funding, with total costs ranging from \$3,000 to \$5,000 per hectare, much of which is allocated to labor. For this reason, most producers utilize credit, yet it is often inaccessible due to the lack of formal channels for rural finance.

Even if the credit needed to renovate is available, the terms and repayment schedules may not take into account the constrained and time-delayed cash flows of farmers who must wait years before productivity resumes, the so-called “valley of death” when coffee revenue is severely limited. Without access to flexible financing as well as inputs and training, farmers are left with few alternatives.

**Figure 5: Regional Average Cost of Renovation**



**Figure 6: Breakdown of Renovation Cost Components**



## Box 6. The Critical Role of Internal Credit Funds

By aggregating hundreds and often thousands of smallholder producers, farmer cooperatives and similar organizations provide rural communities with much-needed services. These producer organizations, both large and small, serve as central gathering points for otherwise disaggregated smallholders, making the disbursement, monitoring, and collection of credit in small amounts more feasible and usually more cost effective for rural borrowers. And with an intimate understanding of the needs and production capacity of their members, agricultural cooperatives with internal loan funds can more quickly and closely match credit disbursements with expenditures and collateralize loans with assets such as land titles or future product if necessary.

A functioning, transparent, and self-sustaining internal credit fund represents a critical step for a cooperative to become a multi-service provider to its members. Today, there are many success stories of cooperatives developing what essentially becomes a rural bank — providing individual with access to credit and overcoming what is often an insurmountable obstacle in extending financial services to smallholders: last mile, direct-to-farmer delivery.

However, offering credit to members (and often to non-members as well) is neither a practical nor prudent option for cooperatives that are undercapitalized, under-resourced, or suffer from weak governance. As agricultural cooperatives decide to become micro-lenders as well, they must build more sophisticated accounting systems and solve for new challenges. Some cooperatives may be unable or unwilling to invest the financial and non-financial resources that are required to operate a revolving loan facility. For others, such a move may prove to be a distraction that jeopardizes their core agricultural-based business over time.

While many cooperatives have previously extended micro-credit funds to their members in the form of short-term, pre-harvest financing, the provision of long-term financing is new territory for most. Well-designed and well-run internal controls and accounting systems are essential when offering farmers relatively large, multi-year renovation loans. Indeed, much of the ultimate success or failure in financing renovation and rehabilitation is dependent on the strength and stability of a cooperative's internal credit fund.

An effective internal credit funds requires, among other things, well-trained and appropriately paid staff; realistic capitalization strategies, including lines of credit and the use of retained earnings; clear decision-making policies and procedures; timely and accurate monitoring and evaluation of portfolio performance; transparent recordkeeping; and efficient portfolio servicing, including all processes and activities required to evaluate, approve, disburse, monitor, and recover loans. However, many enterprises struggle to develop these capacities. And these are the most commonly observed deficiencies among potential renovation and rehabilitation clients due, in large part, to a skills gap and lack of trained financial professionals. For example, we have seen cases of cooperative leaders with minimal financial knowledge running day-to-day operations of what are often informal and unregulated internal credit funds — a task that should be the responsibility of a full-time accountant who is removed from the commercial activities of the cooperative and with full oversight from a well-informed and involved board of directors. At times, credit decisions can be politically or personally motivated, rather than being based on established policies to determine financial need and creditworthiness.

Root Capital's financial advisory team has therefore placed special emphasis on promoting foundational measures for internal credit funds, such as internal controls and accounting systems (**See Enterprise-Level Financial Fundamentals Diagnostic Tools**), and this is a core focus of accompanying technical assistance.

## Designing a Multi-Year Loan Product

While an increasing number of financial institutions are engaging in agricultural value chain finance, few are offering long-term loans for on-farm production improvements, and even fewer are financing the renovation or rehabilitation of perennial tree crops.

Throughout our 15-year history, Root Capital has provided cooperatives and private enterprises with more than \$900 million in financing. Of the roughly 2,000 loans we have closed since 1999, 80 percent had short-term tenors of less than 12 months. To structure these short-term working capital and trade credit loans, we typically require that clients have in place forward purchase agreements with buyers against which we lend. In most instances, this triangulation model avoids the need for fixed-asset collateral.

Under CFRI, Root Capital is providing R&R loans of up to seven years with a two-year grace period on principal repayments. We currently market renovation loans to clients within Guatemala, Honduras, Mexico, Nicaragua, and Peru. To date, we approved loans for nine clients: two in Honduras, one in Mexico, two in Nicaragua, and four in Peru.

These loans are made directly to enterprises: producer organizations, private businesses, or local financial institutions that aggregate individual farmers. In the context of renovation financing, these businesses on-lend funds as smaller loans to individual producers and, in doing so, bear the risk of repayment. Enterprises manage all loan origination, disbursement, monitoring, and repayment internally through an internal credit fund (**See Box 6**).

As the official counterparty, the enterprise is responsible for repaying the loan in full to Root Capital. For this reason, we require collateral, and we verify through initial due diligence and ongoing monitoring that the enterprises to which we lend are well-positioned to implement renovation financing by having both the necessary accounting systems in place as well as the requisite technical agronomic knowledge.

To responsibly underwrite R&R credit, Root Capital had to invest in or adapt a number of internal systems and client services. For example:

- We raised longer-term, ten-year debt and extended the tenor of existing notes with our investors to match the long-term duration of renovation and rehabilitation loans.
- We hired two agronomic advisors who advise our loan officers on the technical aspects of renovation plans as part of our agronomic due diligence and assist with loan monitoring by verifying land under renovation.
- We enhanced our advisory service offering to support clients in developing strong accounting and internal credit systems so that they could on-lend funds to individual producers, and we facilitated access to third-party agronomic trainings.

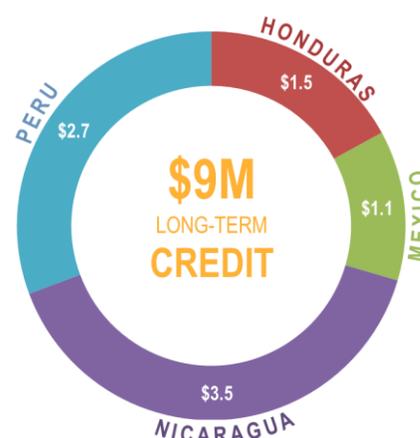
### Box 7. Renovation & Rehabilitation Loans

<b>Amount</b>	\$100,000 to \$2M
<b>Purpose</b>	Rehabilitation or renovation of permanent crops
<b>Tenor</b>	Up to 7 years, with a grace period on principal payments for up to two years
<b>Monitoring</b>	Three visits per year to the enterprise as well as to the farms of 20 percent of participating producers, a sample randomly selected by a Root Capital agronomist
<b>Repayment</b>	Amortized repayment of principal beginning in year three; interest payments begin immediately and are paid on a quarterly basis
<b>Collateral Requirements</b>	100 percent loan-to-value on a fully discounted basis over the life of the loan; offered in land, facilities, hard assets or through joint guarantee

### Root Capital Financing

November 2013 – November 2015

(USD, Millions Approved)



## Conducting Due Diligence and Managing Risk

As a mission-driven financial institution serving agricultural enterprises that are not typically reached by commercial lenders, Root Capital has built a conservative balance sheet designed to absorb potential losses while protecting our investors (*i.e.*, noteholders who lend us capital at below-market rates, on average, of 2 to 2.5 percent per annum and seek a social and environmental return, alongside capital preservation and a modest financial return).

As an institution, we maintain a cushion of loan loss reserves that provide 20 to 25 percent first-loss coverage to these investors. Since our founding in 1999, Root Capital has maintained a historic default rate of three percent among our borrowers and a 100 percent repayment rate to our investors.

Investing in agriculture is inherently risky. The possibility of further crop disease outbreaks, extreme weather events, and a host of other issues makes multi-year renovation and rehabilitation financing much riskier than traditional short-term value chain finance. As such, Root Capital secured two credit enhancements to further protect our balance sheet and reduce risk for investors:

- **A thin slice of dedicated first-loss capital from Keurig Green Mountain up to \$400,000.** This is on-balance sheet capital, meaning that any losses from R&R loans will first come out of this tranche, which represents just under 5 percent of renovation loans approved to date and just under 3 percent of our \$15 million target; and
- **A guarantee facility from USAID's Development Credit Authority (DCA).** This covers 50 percent of losses on up to \$15 million of lending for eligible coffee renovation, rehabilitation and related investments. This guarantee is off-balance sheet, meaning that any losses beyond the \$400,000 absorbed by the first-loss tranche will be reimbursed by USAID at a 50 percent rate.

In addition to having the capacity and infrastructure to meet projected production volumes, potential clients must have more than five years of operating history and three years of audited financial statements from which we derive key financial ratios, such as the ability to service existing debt. Enterprises must also have adequate sources of internal financing to cover at least 20 percent of the R&R investment cost, although exceptions are made for organizations that have been particularly affected by leaf rust but meet minimum requirements of business stability and management capacity.

Through our underwriting process, we assess credit risk of borrowers using an internal rating system that weights various risk categories, including scale and diversification, franchise strength and growth potential, financial flexibility, and financial strategy. This data is combined with the experience and judgment of our loan officers to inform a full assessment of credit risk. All potential loans, including those under CFRI, are scored using this risk-rating methodology.

For R&R lending, prospective clients must submit an agronomic plan accompanying their loan application, and the plan must be endorsed by a Root Capital-approved agronomist. At a minimum, it must include the following components:

- Diagnosis of coffee farms, including the estimate of damage in number of trees affected.
- Prescribed treatment by percent of land under cultivation that requires renovation or rehabilitation, and percent that is going to be renovated or rehabilitated using funds from Root Capital.
- Selection/application of adequate farm inputs that meet our environmental sustainability standards.
- Projected revenue and costs of the renovation or rehabilitation plan. Agronomic projections are a key input into the organizational cash flow forecast used by the loan officer to determine the client's financing need. This forecast includes plant mortality and annual yield estimates.

As part of due diligence, Root Capital agronomists conduct at least one on-site visit to the potential client and interview members of its agronomic team, as well as at least two producers chosen at random to confirm the quality and capacity of the enterprise's support team. In these visits, Root Capital agronomist advisors use diagnostic tools (**See Tools**) to assess the following:

- 1.) Experience of the agronomic team and key management personnel in delivering quality technical assistance and successfully implementing R&R projects;
- 2.) Capacity of the agronomic team in relation to the number of members receiving assistance;
- 3.) History of the relationship between farmers and agronomic team members; and
- 4.) Overall quality of the agronomic data collection and analysis systems.

The Root Capital agronomist then confirms or rejects the viability and operational soundness of the proposed plan, detailing any perceived issues and how the client has addressed those issues. Any material issues raised in the agronomist's assessment must be addressed in the loan officer's credit proposal with associated mitigating measures. If the agronomist's initial review does not result in approval of the plan, then clients may receive follow-up support from a two-person advisory team, including an agronomist and a financial advisor.

Alongside the agronomic components of due diligence, loan officers conduct comprehensive financial analysis of potential clients and their internal credit funds. It is required that every R&R loan candidate complete a diagnostic outlining the strengths and weaknesses of its internal credit fund, policies and processes, and management. The client must work with Root Capital's financial and technical advisory teams to complete (or update, in the case of existing Root Capital clients) its diagnostic (**See Box 10**).

Additionally, as part of Root Capital's process for evaluating prospective borrowers, we have designed customized social and environmental scorecards to complement our financial credit-scoring methodology for all loan applicants. Using these scorecards, loan officers evaluate enterprise-level performance based on self-reported client responses as well as observations from farm and enterprise visits. This information on social and environmental performance and likely impacts informs credit decisions; any enterprise that does not meet our social and environmental standards is not eligible for financing without remedial action, regardless of its financial strength and business acumen.

Note that the social and environmental scorecards are designed as a performance metrics system, not an impact assessment system. They do not capture information about causality or the counterfactual (e.g., what would have happened in the absence of our financing or training). We complement social and environmental due diligence with deeper impact studies to assess changes over time at both the enterprise and producer levels (**See Box 8**). *(For more information on Root Capital's social and environmental due diligence – including the scorecards our loan officers use – please see our [2014 Issue Brief](#) on the topic.)*<sup>28</sup>

## Box 8. Measuring Impact

As a financial institution and provider of ancillary advisory services, Root Capital has impact at two levels: 1) on enterprises via our lending and advisory services; and 2) on the incomes of the small-scale farmers that benefit from our lending and training to these enterprises. We are interested in understanding how our services generate impact at both levels.

Each year, we work with several enterprises to conduct deeper evaluations that gather qualitative and quantitative information. These go beyond our standard social and environmental scorecards and allow us to evaluate whether and how our clients support farmer livelihoods; verify that we are truly reaching under-served businesses; and inform our assumptions about what social and environmental practices truly create positive impacts.

In 2014, our team developed a set of CFRI-wide impact indicators, and over the past year we have conducted baseline evaluations with four renovation loan clients. With each client, we surveyed a sample of the target population of members accessing Root Capital's financing as well as two comparison groups: a) affiliated farmers who are not renovating; and b) non-members of the cooperative at the time of the study (please see below for sample sizes).

Client	Renovating Member Surveys	Non-Renovating Member Surveys	Non-Member Surveys	Total Surveys
Unicafec (Peru)	41	46	46	133
Soppexcca (Nicaragua)	59	55	55	169
Cenfrocafe (Peru)	63	52	65	180
Crediflorida (Peru)	55	58	56	169
	<b>218</b>	<b>211</b>	<b>222</b>	<b>651</b>

In the majority of impact studies, producers affiliated with our clients regularly cite access to technical assistance — agronomic extension services, specifically — provided by the enterprise as the most valued aspect of membership. In 2014, 85 percent of active clients across our portfolio of 280 enterprises provided agronomic extension to farmers to promote adoption of sustainable practices. (The topic of agricultural businesses as “last mile” providers of agronomic technical assistance will be explored in a forthcoming issue brief published by Root Capital). Nevertheless, we also found that pervasive resource constraints, knowledge constraints, and understandable risk aversion prevent farmers affiliated with Root Capital's clients from applying good agricultural practices as consistently and as fully as they might, and we are seeing these factors contribute to a slower than anticipated adoption of renovation.

Guided by these and other findings from impact studies, we developed an organization-wide impact framework that offers a model to assess and strengthen the relationship between these businesses and the farmers with whom they work. The framework complements the [theory of change](#) for smallholder agriculture developed by the Initiative for Smallholder Finance by expanding on the relationship between producers and rural enterprises.

## Box 9. Learning From Colombia: Subsidizing Large-Scale Renovation

Beginning in 2008, above-average rainfall resulted in humid conditions that caused increased outbreaks of coffee leaf rust across Colombia. Over the next three years, Colombia’s production decreased by nearly one-third.<sup>29</sup> By 2011/12, output fell to a 30-year low; the 7.7 million 60-kilogram bags produced that season represented less than half of what the country produced in the mid-1990s and contributed to a spike in the global benchmark price of coffee that year.

Shortly before the outbreak, the Colombian government in partnership with the Federación Nacional de Cafeteros de Colombia (FNC) mounted a large-scale crop renovation program to replace aging trees: the Permanence Sustainability and Future (PSF) program. To support nationwide renovation efforts, FNC designed a low-interest loan scheme under the program. The minimum a coffee grower could renew was 0.2 hectares and the maximum was 1.5 hectares. Delivered by Banco Agrario, the seven-year renovation loans were specifically tailored to the multi-year period for new trees to become productive and the uneven cash flows tied to annual harvest cycles (e.g., a two-year grace period on principal and interest payments during the period of non-productivity). Average annual interest rates were 10 percent, and borrowers were required to pay back only 60 percent of loan principal.<sup>30</sup>

With the spread of leaf rust, this subsidy was only offered to farmers willing to plant the rust-resistant Castillo variety, a powerful albeit controversial economic incentive to abandon traditional varieties believed by many in the industry to be of higher quality. Additionally, a public collateral fund was established to pool 100 percent of the credit risk. The program temporarily compensated growers during the unproductive period after old trees are cut and before new ones generate income.<sup>31</sup>

Since 2009, two-thirds of Colombia’s coffee-growing lands — roughly 640,000 hectares — have been renovated. As a result, the average age of coffee trees has declined from 15 to 7 years, while average coffee productivity has increased to 900 kilograms per hectare, from 600 kilograms per hectare just five years earlier.<sup>32</sup> With new trees now reaching productive age, output has rebounded, almost doubling the amount produced four years ago; annual production for the 2015/16 season is estimated to top 13 million 60-kilogram bags.

It is important to highlight that this is the only example of a country implementing large-scale coffee renovation in a coordinated way. Much of the success of Colombia’s PSF program can be attributed to the country’s strong coffee institutions, which have been in existence for over five decades. This level of capacity, coordination, and committed funding is still largely absent throughout other coffee-producing countries. This underscores the need for blended finance and the importance of collaboration across research organizations, financial institutions, buyers, technical assistance providers, and agricultural enterprises.

“Colombia’s production is only now beginning to rise again after five years of steady declines. Colombia’s national coffee program dates to 1927. Its research center to 1938. Its breeding program to 1961. Colombia’s national coffee program, in short, is arguably the most powerful in the world.”

Michael Sheridan  
Borderlands Coffee Project Director, CRS

**Figure 7: Colombia’s Road to Recovery – Coffee Production Since 2000**



<sup>29</sup> Avelino, Jacques, et al., “The Coffee Rust Crises in Colombia and Central America (2008 – 2013): Impacts, Plausible Causes and Proposed Solutions,” *Food Security*, 2015.

<sup>30</sup> Rios, Luz Diaz, “Recent Experiences of Coffee Replanting Programs in Colombia” in “Risk and Finance in the Coffee Sector,” Agricultural Global Practice Discussion Paper 2, The World Bank, February 2015.

<sup>31</sup> Ibid.

## Building Client Capacity

To increase the capacity of agricultural businesses to absorb and effectively manage credit, the provision of technical assistance is critical. The nine clients approved for renovation loans thus far have required a total of 320 days of technical assistance training over the past two years, of which roughly two-thirds was for financial management training and one-third for agronomic training. Without this accompanying support, we would not have been able to make the majority of these loans and would have assumed greater risk on those that we did originate.

Utilizing a network of 35 full- and part-time financial consultants across the five CFRI countries, Root Capital delivers financial advisory services to managers and accounting staff of both potential and existing clients with the goal of strengthening the financial management capacity of these businesses.

Financial management training begins with an initial one-day diagnostic to identify weaknesses and opportunities for improvement (**See Box 10**). Using a scorecard developed by our advisory team, we work with participants to evaluate the strength of their enterprise's financial planning and analysis, internal controls, accounting systems, and overall financial literacy (**See Tools**). After conducting the initial financial diagnostic, Root Capital staff work in partnership with the client to develop a customized action plan to improve performance. Based on the results of the diagnostic, as well as the needs expressed by the client and the recommendation of the loan officer, we deliver follow-up advisory services across the following areas:

- **Managerial:** We support senior management in developing strategic plans and tools to analyze financial performance and mitigate risk.
- **Organizational:** This broader set of training modules focuses on organizational management, financial literacy, governance, commercialization of product, pricing, and price risk management.
- **Technical:** The foundation of our training curriculum lies in our technical modules: bookkeeping, basics of accounting, cash flow forecasting, and inventory management systems.
- **Internal Credit:** Modules in this area overlap with those above but focus principally on building and managing internal credit funds. Specific trainings include those on internal credit fund management, portfolio analysis, advanced accounting, and advanced internal controls.



## Box 10. Evaluating Financial Capacity of Clients

Conducted before and after an advisory engagement, Root Capital’s financial diagnostic tool measures capacity of both the overall enterprise and its internal credit system. The underlying indicators used in this analysis can be found in the tools section of this report. We have found a score of “2” as being the minimum acceptable threshold for enterprises to be able to effectively manage credit. For those clients seeking multi-year renovation finance, we typically look for scores at or above “3” on all categories, especially those related to internal credit systems. The provision of financial management training continues after we disburse a loan, and we often expand our advisory services relationship with clients over time to meet their evolving needs, including new efforts to introduce mobile technology platforms.

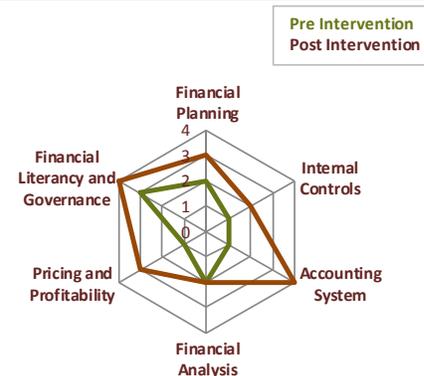
### Financial Fundamentals Scorecard

#### Client Information

**Client Name:** Medrar Cooperative    **Product:** Coffee (Arabica)    **Country:** Guatemala

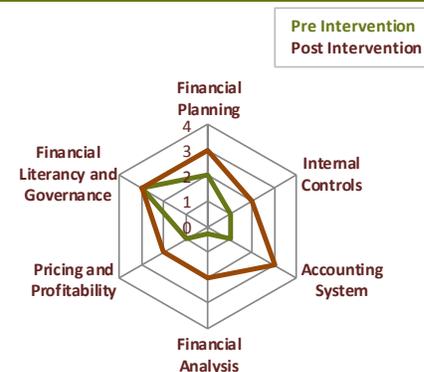
#### Enterprise-Level Performance

	Days		Scoring	
	Delivered		Pre	Post
Financial Planning	1		2	3
Internal Controls	2		1	2
Accounting System	4		1	4
Financial Analysis	0		2	2
Pricing and Profitability	3		1	3
Financial Literacy and Governance	1		3	4
<b>Total days</b>	<b>11</b>			



#### Internal Credit Performance

	Days		Scoring	
	Delivered		Pre	Post
Financial Planning	1		2	3
Internal Controls	2		1	2
Accounting System	4		1	3
Financial Analysis	3		0	2
Pricing and Profitability	2		1	2
Governance	0		3	3
<b>Total days</b>	<b>12</b>			



# Leveraging Private Sector Investment for Technical Assistance

For smallholder farmers and the enterprises that aggregate them, it is rarely the case that both capital and technical assistance are available. Bringing the two together is essential for managing risk and expanding the addressable demand for R&R finance.

As the leaf rust outbreak worsened, coffee buyers and traders quickly recognized the social, economic, and environmental devastation occurring at the base of their supply chains. Yet many buyers struggled to develop a concrete and coordinated response to the crisis. They were unsure of what interventions were needed and, acting independently, could not bear the full costs of addressing such a complex challenge that impacts the entire industry.

To overcome this collective action hurdle and mobilize the interests of traders and roasters, Root Capital designed the Resilience Fund, a companion facility within the broader initiative to fund technical assistance activities for agricultural enterprises. USAID committed \$2 million to the Resilience Fund under the Global Development Alliance (GDA), a mechanism designed to mobilize matching funds from the private sector. Three leading specialty coffee roasters — Cooperative Coffees, Equal Exchange, and Keurig Green Mountain — committed a combined \$2 million to match USAID's contribution and channel investments directly to their suppliers. These companies recognized that supporting smallholders in becoming more productive and resilient can, in turn, reduce their own costs, enhance supply chain stability, strengthen risk management, build supplier loyalty, and advance their commitments to corporate sustainability.

Enterprises participating in CFRI can apply to the Resilience Fund for grants to build agronomic capacity, launch income diversification projects, and improve internal business operations. Prospective recipients submit a short proposal describing how they intend to use the funds to invest in resilience activities. Root Capital and our private sector partners evaluate the strength of each proposal, work plan, and budget and determine the potential for impact. If selected, enterprises are awarded up to \$25,000 per year, with the possibility of two renewals. Grantees are required to co-fund a minimum of 20 percent of project costs in the first year, 25 percent in the second year, and 30 percent in the third and final year.

The Progreso Foundation, a Netherlands-based nonprofit organization that specializes in technical assistance provision to coffee cooperatives, supports the administration and implementation of activities. In addition, the Junta Nacional del Café, the Peruvian trade association that represents coffee producer organizations, acts as an agronomic service provider in Peru. As of late-2015, the Resilience Fund has supported 32 enterprises to invest in climate-smart agriculture, develop income diversification projects, and adopt mobile technologies for productive purposes.



Figure 8: Farmer Resilience Fund Capitalization

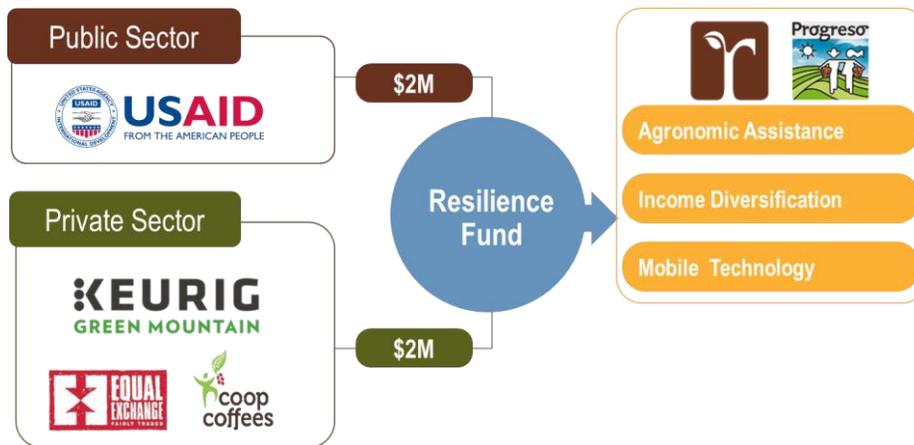
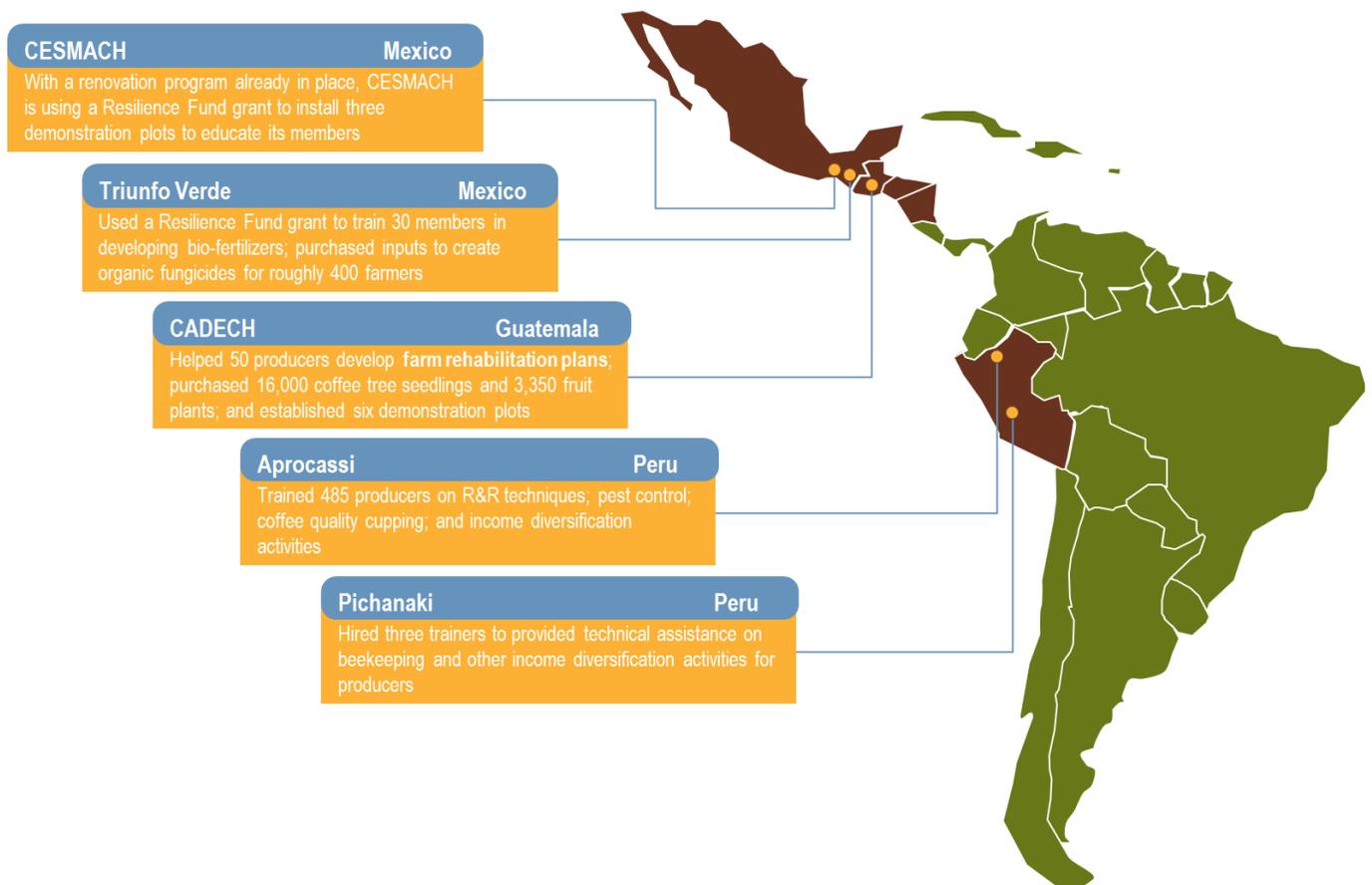


Figure 9: Examples of Resilience Fund Investments



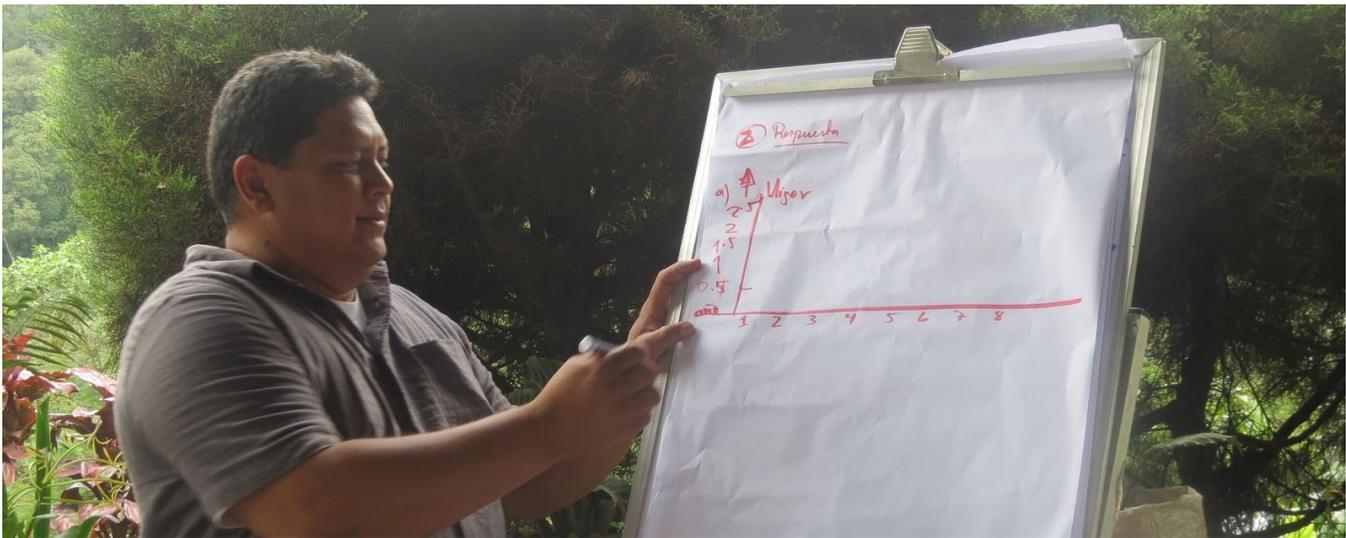
## FACILITATING AGRONOMIC ASSISTANCE

As part of CFRI, Root Capital’s advisory team is coordinating with third-party agronomic advisors, local universities, and government partners to help clients develop and implement renovation and rehabilitation plans built on sound, climate-smart agronomic practices. During agronomic training workshops, special attention is paid to varietal selection, seedling production, compost application, farm maintenance, and integrated crop management.

In the first year of the Resilience Fund, it was notable that all enterprise proposals included requests for support for agronomic extension activities. One coffee cooperative in Peru, for example, requested funding from Root Capital’s Resilience Fund to launch a peer-to-peer training program, sending staff to another local cooperative known for its innovative farmer extension program. These proposals reinforce the need for greater investment in extension services and suggest models for how private and public partners might co-fund these investments (*See forthcoming Root Capital Issue Brief on this topic*).

For instance, working in close collaboration with the Junta Nacional del Café in Peru, we have held agronomic workshops focused on standardizing indicators and evaluation tools for technical assistance in coffee renovation. A total of 55 technical staff representing 23 coffee enterprises from across the country participated in these trainings.

To oversee this and related work, Root Capital has hired two experienced agronomic advisors, one for Central America and Mexico and the other for Peru. Their role is to reduce risk for both clients and Root Capital by ensuring the technical feasibility of renovation and rehabilitation loan proposals. This involves evaluating plans for establishing nurseries and organic fertilizer plants; conducting farm-level monitoring visits; and facilitating agronomic training on topics related to R&R.



### Box 11. Investing in Community Nurseries

SOPPEXCCA, a Root Capital client since 2003, is a Fair Trade and organic certified coffee cooperative located in the forested mountains of northern Nicaragua. The enterprise aggregates production from 650 members, 80 percent of whom were affected by leaf rust in 2013.

The cooperative accessed a \$2 million long-term renovation loan from Root Capital — the first approved under CFRI — for its members to renovate approximately 1,000 hectares. Though SOPPEXCCA is in many ways a model cooperative, the organization faced barriers to implementing a comprehensive coffee renovation plan. Therefore, the manager of the cooperative applied for a grant from the Resilience Fund. With this funding, SOPPEXCCA has expanded its team of agronomists, constructed a seedling nursery, and developed new technology platforms to monitor farmer performance.



## INVESTING IN INCOME DIVERSIFICATION

The leaf rust outbreak underscores the fragility of livelihoods dependent on a single crop. Typically, farmers have not diversified their production or their income streams enough to be resilient to such production shocks. Indeed, a recent Catholic Relief Services survey of coffee cooperatives in Central America that collectively represent more than 6,800 farmers revealed that only 23 percent had access to income-generating activities besides coffee farming.<sup>33</sup>

However, coffee production may no longer be a viable source of income for millions, as changing climatic conditions affect the types of crops that can be cultivated in different agro-ecological zones and altitudes. More immediately, income-diversification initiatives can strengthen food security as households absorb the shock of lost income tied to leaf rust and endure the two- to three-year “valley of death” between the time they uproot diseased trees and when new trees become productive.

Training and investment to support income diversification is a critical component of smallholder resilience. With the financial support of the Resilience Fund, enterprises have turned to the development and launch of small side businesses — from apiculture and aquaculture to fertilizers and fruit trees — as a complementary income-generating and food security strategy.

From the project design standpoint, a key lesson has been that successful income diversification initiatives must originate from a real identified need and must be led and at least partly funded by farmers and farmer organizations themselves. In some regions, coffee cultivation is inextricably linked to local culture, and farmers have had difficulty envisioning themselves as anything other than coffee growers. Additionally, finding suitable candidate organizations willing to commit time and resources to deploy and/or scale an alternative income-generating initiative has proven challenging. Market access for the produce of income-diversification initiatives has also been difficult for farmer organizations; in some cases, we have seen farmers and cooperatives commit substantial time and resources to launch a new product only to struggle to find interested buyers. For these reasons, it is prudent for income-diversification initiatives to start small and grow in response to market demand.

### Box 12. Aquaculture in the Andes

Since 2006, the CAPEMA cooperative has helped 250 smallholder coffee farmers in Northern Peru sell high-quality coffee to buyers in North America and Europe.

After years of strong revenue growth, the spread of leaf rust led to a 50 percent decline in volume of coffee delivered to the cooperative in 2013.

Contributing roughly \$5,000 of their own funds, CAPEMA constructed freshwater aquaculture ponds for the production of tilapia and tambaqui fish, building on the cooperative’s history of investing in income diversification and capitalizing on increasing demand in the aquaculture market. Under the project, CAPEMA hired two technical advisors and trained 20 families to manage the ponds.



<sup>33</sup> Sheridan, Michael, “Coffee Rust: What’s Below the Surface?” CRS Coffeelands, April 24, 2014.

## INTRODUCING MOBILE TECHNOLOGY TO RURAL ENTERPRISES

Disbursements for renovation loans require that producers comply with the terms and conditions in the original plan presented to Root Capital by the enterprise. However, both Root Capital and our clients often have limited visibility into farm-level practices and performance. Therefore, as part of CFRI, our team has supported the implementation of mobile platforms to improve farm-level agronomic inspection and overall information management.

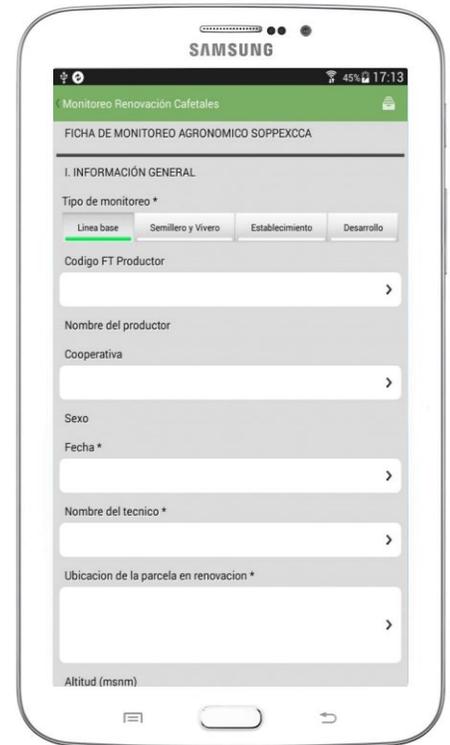
In doing so, we have observed strong demand among clients for mobile technologies and analytical data platforms. They seek to learn what types of systems are available, how much they cost, what tools are most appropriate for their business needs, and how to actually go about introducing them into their existing processes, which are often only paper ledgers.

For example, in Nicaragua, our advisory services team partnered with coffee cooperatives to design and introduce mobile agronomic monitoring capabilities. This included digitizing the collection of agronomic information at the farm-level and GPS-mapping of reported incidence of leaf rust, enabling analysis of agronomic practices and performance vis-a-vis targets to guide credit disbursements and inform technical assistance.

We have also fielded requests for support from certified coffee cooperatives in Peru that are interested in developing a mobile inspection program. With their sustainability certification, these enterprises are required to conduct internal inspections of all farms once per year. Their desire for more automated systems was driven by the perceived ease of use and the ability to accurately capture and analyze information without the time-consuming (and error-prone) process of inputting data into a computer after the fact. Under CFRI, we have piloted a business advisory service to help certified businesses digitize their internal inspection forms, perform tablet-based inspections with suppliers, and finally aggregate and analyze supplier information using simple data visualization platforms.

We have offered this service to three coffee cooperatives in Peru, which have conducted more than 1,200 farm inspections to date using iFormBuilder, a data collection software platform for mobile devices. Initial results indicate that the mobile inspection process has achieved the following:

- **Improved data quality** by reducing the margin of error during data entry from up to 30 percent under the paper-based method to less than one percent under the digital method.
- **Increased data relevance and usefulness** by shortening the time lag between data collection and analysis and making the data easier to manipulate and analyze.
- **Saved staff time** by reducing the time required to aggregate supplier data from around two months (with two or more inspectors entering data) to less than four hours.



Using iFormBuilder as a platform, Root Capital advisory staff supported SOPPEXCCA in digitizing farm-level monitoring of renovation loans in Nicaragua.



SOPPEXCCA used geo-information data to map the coordinates of its members who are renovating. The above map illustrates the incidence of leaf rust among more than 100 producers.



Using data collected by the cooperative's team of agronomists, SOPPEXCCA can now track progress of its members who are renovating and analyze performance.

# Looking Ahead

The swift and immediate impact of leaf rust has been felt throughout the coffeelands in Latin America: on households struggling through the hunger season; on laborers whose main income is generated during the harvest season; on enterprises that offer critical services, training, and market access for farmers; and on the agricultural economies of Latin America that depend on coffee for domestic employment and export earnings.

For economically vulnerable coffee producers and laborers living on the margins at less than \$2 per day, shocks and stresses such as these can quickly push them deeper into poverty. When the global coffee market collapsed in 2001 and prices dropped to \$0.45 per pound, the day-to-day realities of coffee farmers started to attract wide public attention. And many in the industry recognized that low prices and short-term price volatility in the futures market can have long-term consequences at the farm gate.

Today, private sector companies are investing in the sustainability of their supply chains in ways that deliver shared value for all participants. Meanwhile, demand for sustainably produced commodities is growing; consumers are expressing unprecedented interest in the social, economic, and environmental aspects of agricultural production and trade. And after decades of underinvestment, national governments and multilateral institutions are recognizing the fact that, when designed with smallholders in mind, investment in agriculture is among the most powerful forces for achieving inclusive economic growth.

Yet smallholder farmers and the rural enterprises on which they depend are still unable to reach their full economic potential. Price volatility and the unpredictable growing conditions that come with climate change have and will continue to jeopardize the smallholder farmers livelihoods. Indeed, it is likely that coffee leaf rust will plague producers for years to come. Rarely are there quick fixes to these challenges, and CFRI has addressed a minute fraction of the estimated need.

However, we are seeing some encouraging signs of progress — from well-managed renovation plans to income diversification projects — across our lending portfolio of 115 coffee enterprises directly reaching approximately 100,000 farmers throughout Latin America. At the same time, we're also seeing many cases of farmers simply waiting to see what happens to their trees, or abandoning their land in desperation and migrating to work elsewhere.

In the spirit of not letting a crisis go to waste, there are compelling opportunities to support producers in overcoming these challenges and to strengthen the value chain for all participants. We hope that the CFRI can provide insights to inform emerging models for building farmer resilience and prosperity in the coffee sector as well as in other agricultural value chains.

With targeted investment in renovation and rehabilitation — including blended finance, smart subsidies, and accompanying technical assistance — more of the world's farmers will be able build and realize a resilient future.

## Enterprise Financial Fundamentals Diagnosis Tool

Metric	Key Product	Value		Interpretation
Financial Planning	Projected Cash Flow Development	Doesn't exist	0	Management does not carry out any sort of financial projection for the business
		Not sufficient	1	Management does not use cash flow projections to identify their actual financing needs; instead they are estimated empirically
		Weak	2	Management generates financial projections using cash flows, which are not based on clear business goals
		Good	3	Management has an understanding of their financing needs through cash flow projections that are based on clear business goals
		Excellent	4	Management has an understanding of their financing needs through cash flow projections and follows a financial business plan based on an integrated purchase, production and sales plan
Internal Controls	Internal Control Systems	Doesn't exist	0	There is no tool for internal controls
		Not sufficient	1	There are some tools for internal controls, but they are not integrated
		Weak	2	Each management area has its own system of internal controls, but they are not integrated
		Good	3	There is an internal control system that allows the enterprise to monitor inventory, contract management, and cash flows
		Excellent	4	There is a single integrated internal control system as well as a risk mitigation strategy.
Accounting System	Financial Statements	Doesn't exist	0	There is no accounting system and the enterprise does not produce financial statements
		Not sufficient	1	Accounting is the responsibility of an external office and it produces financial statements only for tax requirements
		Weak	2	There is an internal accounting system that can generate financial statements for tax purposes
		Good	3	There is an internal accounting system with quarterly or month-end closings, which allows the enterprise to generate detailed financial statements
		Excellent	4	There is an internal accounting system with month-end closings and detailed and audited financial statements, which serve as a base for decision-making.
Financial Analysis	Managerial Financial Reports	Doesn't exist	0	Management does not carry out any kind of financial analysis
		Not sufficient	1	Management conducts estimated or empirical analysis, without using financial statements
		Weak	2	Management carries out financial analysis using financial ratios from their financial statements
		Good	3	Management knows how to interpret financial statements and ratios to find out about the enterprise's financial situation
		Excellent	4	Management prepares and shares quarterly financial analysis reports based on financial statements and ratios for decision-making purposes
Pricing and Profitability	Break-even Analysis	Doesn't exist	0	The cost structure of the enterprise's product is not known
		Not sufficient	1	The product cost structure is determined by estimating or empirically
		Weak	2	There is a defined mechanism to determine the enterprise's fixed and variable costs
		Good	3	There is cost accounting that makes it possible to know the details of the enterprise's cost structure and conduct break-even analysis
		Excellent	4	The price of the product is determined based on the cost structure and break-even point analysis
Financial Literacy	Meeting Minutes	Doesn't exist	0	Management does not have access to or does not understand the organization's financial statements
		Not sufficient	1	Management has access to the organization's financial statements but does not understand their usefulness in decision-making
		Weak	2	Management has access to the organization's financial statements and receives training on business/financial topics
		Good	3	Management understands the enterprise's financial situation by interpreting financial statements
		Excellent	4	Management communicates financial analysis to members during periodic meetings and makes decisions based on financial information

## Internal Credit System Diagnostic Tool

Metric	Key Product	Value		Guidance
Internal Credit Planning	Short, Medium and Long-Term Cash Flow	0	Doesn't exist	Management does not follow any plan related to internal credit systems nor does it carry out any cash flow projections
		1	Not sufficient	The internal credit system does not utilize an annual operating plan or cash flow projections. However management does make empirical estimates of collections and recoveries
		2	Weak	The internal credit system plan includes an annual operating plan with clear goals related to gross portfolio, recoveries, collections and defaults, as well as projections of the variables listed above, but does not include a cash flow projection tool that would ensure the correct projections related to liquidity and cash flow.
		3	Good	Management also utilizes an annual operating plan with clear goals related to gross portfolio, Recoveries, collections and default and projects these variables as well as cash flows. However management does not monitor the annual operating plan or cash flow.
		4	Excellent	Management utilizes an annual operating plan with clear goals related to gross portfolio, recoveries, collections and defaults, which project these variables as well as cash flows, which management monitors frequently to ensure the correct level of funds available.
Internal Controls for Internal Credit System Management	Tools, Processes and Manuals	0	Doesn't exist	Management does not follow any process or possess a tool related to internal control of internal credit systems.
		1	Not sufficient	Management follows a set of clear procedures, norms and policies throughout the different stages of credit management (application, analysis, approval, disbursement, monitoring and closing), but does not possess the clear documentation necessary to implement these procedures.
		2	Weak	Management follows a set of clear procedures, norms, and policies throughout the different stages of credit management along with the documentation necessary for implementation
		3	Good	Management follows a set of clear procedures, norms and policies throughout the different stages of credit management, along with the documentation necessary for implementation, as well as a clear process manual outlining the steps towards retrieval of defaulting loans.
		4	Excellent	Personnel are designated with responsibilities related to carrying out internal audits related to the enterprise's complying with local norms and regulations as well as the policies, norms and process manuals related to the accounting of the Internal Credit Fund.
Accounting within Internal Credit Funds	Portfolio Reports, Financial Statements and Registration of Credit Systems	0	Doesn't exist	Management does not maintain records of internal credit transactions
		1	Not sufficient	The enterprise possesses an automated system that allows management to register accounting transactions related to internal credit within the general accounting function, but without the ability to generate financial statements related to internal credit systems.
		2	Weak	The enterprise possesses an automated system that allows management to register accounting transactions related to internal credit within the general accounting function, but without the ability to generate financial statements related to internal credit systems. However the system does generate basic reports like portfolio balance.
		3	Good	The enterprise possesses an automated system integrated with the general accounting function that allows management to generate financial statements related to Internal Credit systems, but does not generate sophisticated portfolio reports such as detailing loans that are active, closed, delinquent, refinanced or written off.
		4	Excellent	The enterprise possesses an automated system integrated with the general accounting function that allows management to generate financial statements related to Internal Credit systems, as well as generate sophisticated portfolio reports such as detailing loans that are active, closed, delinquent, refinanced or written off.
Financial Analysis of	Portfolio-Related	0	Doesn't exist	The enterprise does not carry out any financial or credit analysis related to the portfolio.

<b>Internal Credit Portfolios</b>	Financial Ratios and Analyses	1	<b>Not sufficient</b>	The enterprise carries out portfolio-related financial analysis in an empirical manner without the use of financial reports.
		2	<b>Weak</b>	The enterprise carried out portfolio-related financial analysis, based on financial statements related to internal credit systems and portfolio reports, but without utilizing financial indicators or ratios.
		3	<b>Good</b>	The enterprise carried out portfolio-related financial analysis, based on financial statements related to internal credit systems and portfolio reports, along with some financial indicators or ratios - but without clarity as to which indicators are the most relevant and useful.
		4	<b>Excellent</b>	On a monthly or quarterly basis, the enterprise carries out financial analysis based on financial statements related to internal credit systems through the analysis and interpretation of indicators like self-sufficiency, portfolio yield, operational costs and financial structures. Additionally, the enterprise analyses the internal credit system, based on portfolio reports containing analysis and interpretations of indicators related to quality, coverage, risk and growth.
<b>Interest rate and Profitability of Portfolio</b>	Costs, Interest Rates and Break-Even Points	0	<b>Doesn't exist</b>	Management is not aware of costs related to the administration of internal credit systems nor how to calculate interest rates.
		1	<b>Not sufficient</b>	Management is aware of cost structures related to internal credit in an empirical manner but does not know how to calculate interest rates.
		2	<b>Weak</b>	Management has a clear idea about cost structures related to internal credit funds but interest rates are set based on rates charged by local financial institutions.
		3	<b>Good</b>	There is clarity around the cost structures related to internal credit systems and calculations are run to determine the break-even point. Interest rates are based on rates charged by competition.
		4	<b>Excellent</b>	Cost structures related to internal credit systems allow the enterprise to calculate interest rates based on the following variables: operational costs, irrecoverable costs, financial costs, capitalization rates and investment incomes. Additionally, the calculated rates are aligned with existing market rates and organizational strategy
<b>Governance of Internal Credit Funds</b>	Norms, Regulations and Committees	0	<b>Doesn't exist</b>	Directive bodies are not familiar with norms (policies and procedures) nor procedures related to internal credit funds and do not carry out any related functions.
		1	<b>Not sufficient</b>	Directive bodies carry out functions within the management of internal credit funds purely from an operational standpoint and do not participate in decision-making activities.
		2	<b>Weak</b>	Directive bodies develop functions and take strategic decisions related to the management of internal credit systems but are not familiar with related policies and procedures.
		3	<b>Good</b>	The board members, monitoring and credit commissions are familiar with and base their decisions on the functioning of a set of policies and procedures related to internal credit systems but do not put in writing each member's function.
		4	<b>Excellent</b>	The board members, monitoring and credit commissions are familiar with and base their decisions on the functioning of a set of policies and procedures related to internal credit systems and put in writing each member's function. Additionally, they have the capacity to present financial plans and information related to portfolios to the general assembly.

## Producer-Level Agronomic Performance Indicators

### Agronomic Indicators (Collected On Farm)

	Unit of Measure	Reporting Guidance
<b>Producer name</b>		Full name of individual producer
<b>Plot location</b>		GPS coordinates or local address
<b>Altitude</b>	<i>MASL</i>	Altitude in meters above sea level
<b>Certification(s)</b>		Examples: Organics (USDA Organic, Bio Suisse, EU Organic, JAS), Fair Trade (Fair Trade, FLO), Rainforest Alliance, Bird Friendly, 4C, and others
<b>Total area under coffee cultivation (includes affected areas and areas with 100% mortality)</b>	<i>Hectares</i>	-
<b>Minimum and maximum age of plants in the area under cultivation</b>	<i>Years</i>	Rehabilitation: Plants six years and older at no more than 20% of plantation. Renovation: Determine according to productivity conditions and plant age, by plot area. Research has shown that, ideally, 20% of the area should be renewed every year to keep yields constant over time. Although there may be constraints to accomplish this, this parameter should be used as a guide for optimal renewal goals.
<b>Planting density</b>	<i>Plants per hectare</i>	In plants per hectare: 3,000 – 4,500 plants per hectare. See below table for planting distances.
<b>Shade density</b>	<i>Number of shade trees per hectare</i>	Depends on climate conditions, elevation, and tree type
<b>Varieties planted</b>	<i>Number of plants planted per variety.</i>	Even though it is important to plan trust-resistant varieties (Typical and Catimor), market and cup considerations (what the client requests) should be taken into account, as well as susceptibility to other diseases. For instance, at elevations and conditions over 1100 MASL, Catimor may be susceptible to Ojo de Gallo attacks.
<b>Projected area for R&amp;R</b>	<i>Hectares</i>	A diagnosis of the coffee field is necessary to determine the best approach to renovation or rehabilitation. The appropriate pruning system in rehabilitation also depends on this diagnosis. The following can be used as a parameter: at least 1 of every 5 trees (20%) should be rehabilitated annually to maintain constant yields over time.
<b>Actual area for R&amp;R</b>	<i>Hectares</i>	
<b>Agronomic intervention type</b>	<i>Renovation or rehabilitation</i>	Based on age, plant health and yields of the plants.
<b>Mortality rate at the farm (prior to and during intervention)</b>	<i>Number of dead plants / # of plants alive (= mortality %)</i>	Maximum 10%
<b>Mortality rate of the intervened area, at each stage (prior to intervention, nursery, establishment, development)</b>	<i>Number of dead plants / # of plants alive in the area to be intervened (= mortality %)</i>	Maximum 10%. Both in planting and in stem-cutting propagation, 10% additional plants should be available to make up for seedling mortality.
<b>Average age of plants in nursery</b>	<i>Months</i>	Ideally, keep seedlings no more than 6 – 8 months.

<b>Type of container or recipient used at nursery</b>	<i>Bag, 'tube planter', membrane or other</i>	Very important to help determine the level of technology and capacity of the producer.
<b>Average height of plants in intervened area</b>	<i>Centimeters</i>	At the nursery stage only. This indicator is important to correlate with the type and the time spent in this stage. It is significant to reduce the risk of root deformities.
<b>Origin of seedlings</b>	<i>Own nursery, cooperative central nursery, or third-party nursery</i>	The origin of the seed and seedling should be traceable. Therefore, nurseries should be more transparent and guarantee quality. Also, plants suffer less stress when nurseries are on-farm.
<b>Prevalence of diseases</b>	<i>Infestation %</i>	Every region has its own plant health regime and some extreme areas may be very susceptible.
<b>Coffee yields by stage of production</b>	<i>Kilograms of coffee per hectare</i>	Normal production varies by production system and region.

## Enterprise-Level Agronomic Performance Indicators

Agronomic Indicators (Collected From Enterprise)			
Technical Assessment Indicators		Guiding Parameters	Measurement Unit
<b>General Details</b>	Name of the organization		<i>Name</i>
	Location		<i>City, Dept., Country</i>
	Information collection date		<i>Day / Month / Year</i>
<b>Overall Assessment</b>	The organization has a feasible and consistent implementation plan.	The organization has provided information on its current total production, yields per hectare, and forecasts based on 80% of members renovating or rehabilitating.	<i>1 – 5 scale (1 feasible, 5 non-feasible) + report of Root Capital Agronomic Advisor.</i>
	The organization has a member baseline, which includes the core indicators above.	At least all members with credit for R&R are monitored with basic indicators.	<i>Number of indicators reported / Number total baseline indicators (= baseline compliance %)</i>  <i>1 - 5 score (1 reliable quality, 5 poor quality)</i>
	The organization has the technical capacity to accomplish the production improvement plan.	The organization has a qualified team to detect problems on time, solve them and serve all members making production improvements. It has a team dedicated to field follow-up and budgets to retain the team over the course of the project.	
<b>Technical Capacity Assessment</b>	On-farm technical assistance frequency, per farm	At least three visits per year, ideally in nursery and plantation establishment stages. After the establishment, visits are made following the first fertilization, flowering and harvest.	<i>Number of visits made per farm (general), number of technical assistance visits received (per farm)</i>
	Frequency of collection of monitoring indicators	At least 3 per year, ideal in nursery, plantation establishment, first fertilization, flowering and harvest stages. (Required to update of baseline indicators).	<i>Number of times per year that the technical team collects monitoring indicators</i>
	Number of staff engaged in on-farm technical assistance	On average, a maximum of 150 producers per technician.	<i>Number of personnel providing technical assistance</i>
	Average time that the technical team is dedicated solely to providing on-field technical assistance.	Scattered areas: two visits per day per technician	<i>Hours spent providing on-farm technical assistance/total hours worked by the organization.</i>
	Ratio of technical assistants (extension workers, technicians or agricultural engineers) per member (total)	On average, 3.5 visits per staff member per day	<i># technical assistant visits / # of member</i>
	Total cost invested in technical assistance	Varies according to local salaries	<i>Local currency per year</i>