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SUSTAINABLE COFFEE CHALLENGE

USAID Bureau for Food Security

Renovation & Rehabilitation for Resilient Coffee Farms: A Guidebook for Roasters, Traders and Supply Chain Partners

November 2017

Disclaimer and acknowledgements

Disclaimer

This Guidebook, funded by USAID's Bureau for Food Security under Contract No. GS-10F-0188V, has been written by Dalberg Advisors on behalf of the Sustainable Coffee Challenge Collective Action Network on Renovation and Rehabilitation.

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Foreword: The Sustainable Coffee Challenge

Dear reader,

A key tenet of the Sustainable Coffee Challenge is to encourage the industry to work collaboratively to find effective solutions that address the challenges facing coffee. One of those challenges is deteriorating tree stock, particularly on smallholder coffee farms. In fact, renovation and rehabilitation (R&R) best practices could benefit more than 50% of the 7 million hectares of smallholder coffee lands. Though there has been over USD 1.2 billion already invested in R&R efforts by governments and supply chain actors, we've still only scratched the surface in terms of the need.

So how will we meet this challenge? Over the past several months, partners in the Sustainable Coffee Challenge have set out to address the need for healthy, productive trees. As part of this effort, the network has established a collective target of sustainably renovating and rehabilitating 1 billion trees. In addition, with the generous support of USAID's Bureau for Food Security, Dalberg Advisors has developed the following Guidebook on behalf of the group.

The Guidebook is a rich resource for companies, governments, investors, and service providers alike. The document can help you partner up with an existing effort, start a new effort, or even refine your current program. If you are interested in learning the basics on R&R, then we suggest you review the Executive Summary. If you are a practitioner already familiar with R&R and are eager to dive into details, we suggest you start with Section 3: How to Make R&R work. In this Guidebook, you will find numbers behind the need, rich case studies with lessons from the field, decision trees to determine appropriate program structures and financial models, and much more!

Though there is still much to learn about R&R, we sincerely hope this Guidebook provides lessons and recommendations that help reduce the learning curve while aspiring new, bold commitments to supporting the sustainable renovation and rehabilitation of coffee farms around the globe.

Enjoy!

Bambi Semroc
Vice President, Sustainable Markets & Strategy, Conservation International

To find out more about the R&R Network or the Sustainable Coffee Challenge, visit www.sustaincoffee.org

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CONSERVATION INTERNATIONAL

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List of abbreviations

BAU	Business as usual
CFRI	Coffee Farmer Resilience Initiative
DFI	Development finance institution
ECC	Exportadora de Café California
FFS	Farmer Field School
FX risk	Foreign exchange risk
GAP	Good Agricultural Practices
Ha	Hectares
HRNS	Hanns R. Neumann Stiftung
IDB	Inter-American Development Bank
IFC	International Finance Corporation
Local FI	Local financial institution
NGO	Non governmental organization
NPV	Net present value
PAPP	Programa de Apoyo al Pequeño Productor (*Program to Support Small Producers*)
PIAC	Plan Integral de Atención al Café (*Integrated Plan for Support to Coffee*)
PSF	Permanencia, Sostenabilidad y Futuro (*Permanency, Sustainability, Future*)
R&D	Research and development
R&R	Renovation and rehabilitation
SAGARPA	Mexican Secretary of Agriculture
SHF(s)	Smallholder farmer(s)
SHF org.	Smallholder farmer organization (typically a cooperative)
TA	Technical assistance

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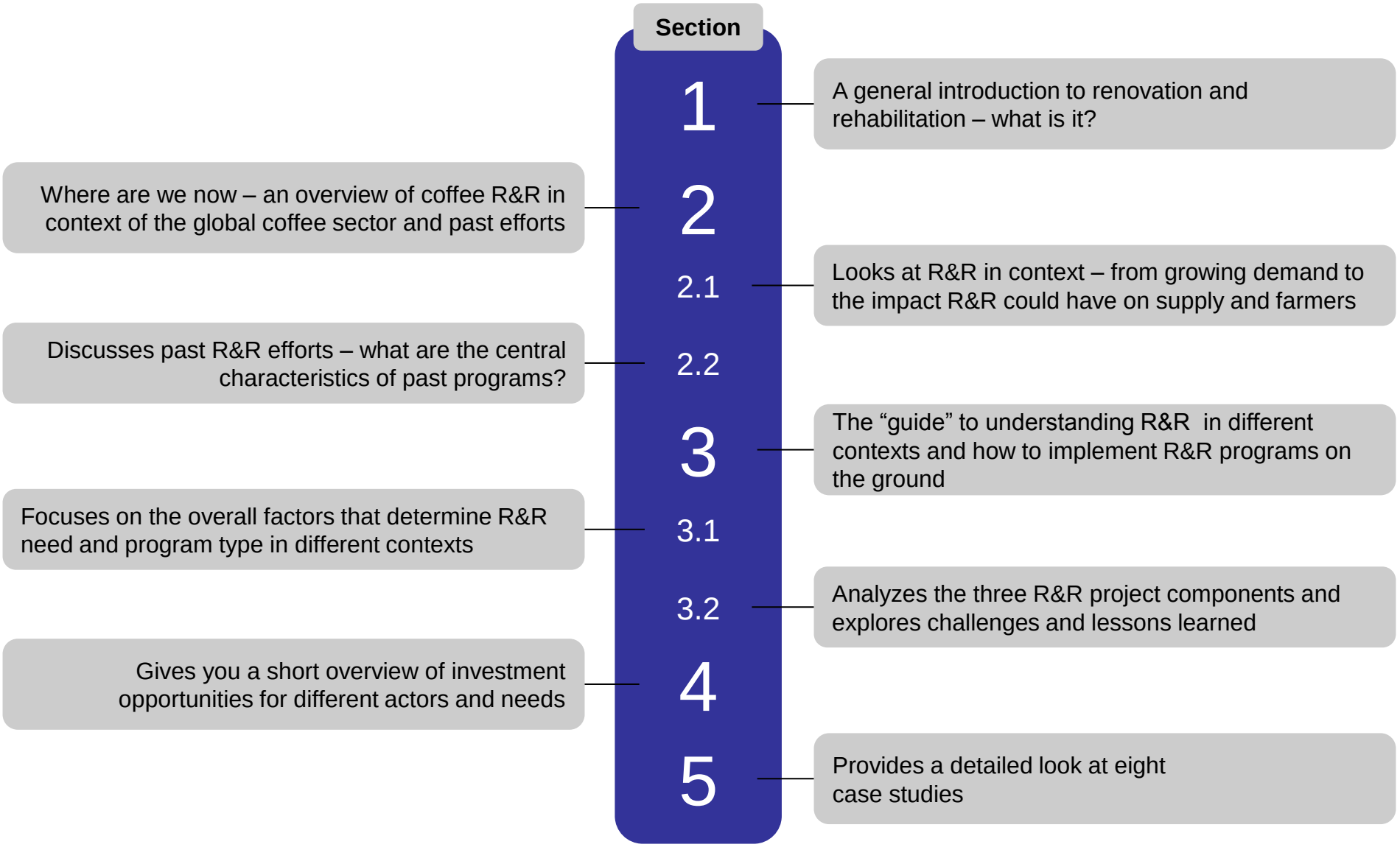
Reader's guide: Who should read what?

Who are you?	What do we recommend you start with?
New to R&R, unfamiliar with the topic	• Executive Summary • Section 1 and 2 for added detail about what has been going on in coffee R&R to date
I know what R&R is, but I'm just getting started	• Section 2.2 to get an overview of efforts to date – what has/hasn't been tried? • Section 4 to understand identified gaps in R&R and potential investment cases
Current R&R implementer	• Section 3 will help you understand if you are addressing the right questions and if your program structure could be adjusted • Section 5, case studies will give you an idea of what others are doing
R&R expert, interested in a particular sub-topic	• Section 3.2 discusses the most recent findings and gaps around the three R&R project components: inputs (seedlings, nurseries, nutrition), finance (how to analyze project bankability), knowledge (key questions on technical assistance)
Donor/lender, interested in financing R&R	• Section 2.2 outlines key actors engaged in R&R and efforts to date • Section 4 outlines gaps to be filled, all of which need additional financing

Reader's guide: Overview of contents



Reader's guide: this Guidebook builds on lessons learned from past and ongoing R&R programs, which are presented throughout the document

This logo indicates a case study

"Short case studies": Across the Guidebook, we will provide glimpses of lessons learned from a number of R&R programs

Name of the program or type of insight	Page
Moringa Fund – Investment in NicaFrance	59
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"Long case studies": We have included eight deep-dive case studies in Section 5

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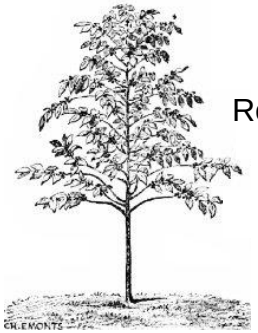
‘Renovation’ and ‘rehabilitation’- R&R – are methods to increase the productivity of coffee trees

Executive summary

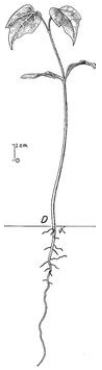
Renovation

Replanting

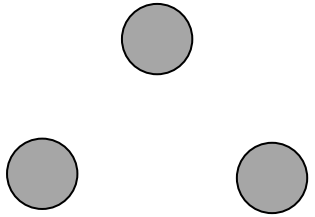


Remove old trees

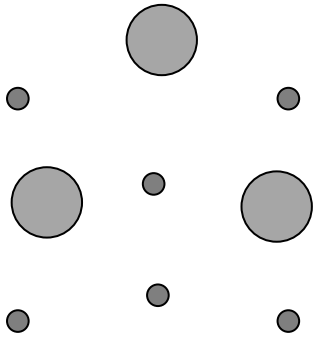
Replace with seedlings



Infill planting



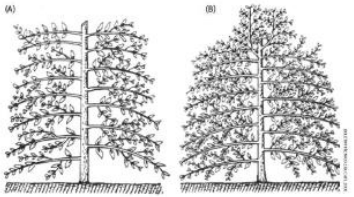
Existing plot



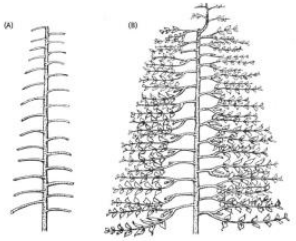
Add new seedlings and/or shading material in between current trees

Rehabilitation

Pruning

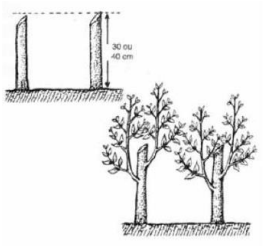


Top only

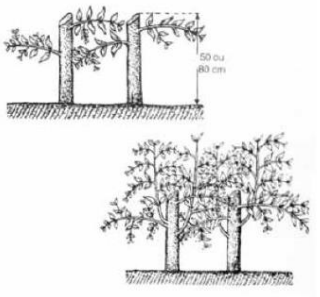


Top and sides

Stumping



Down stumping

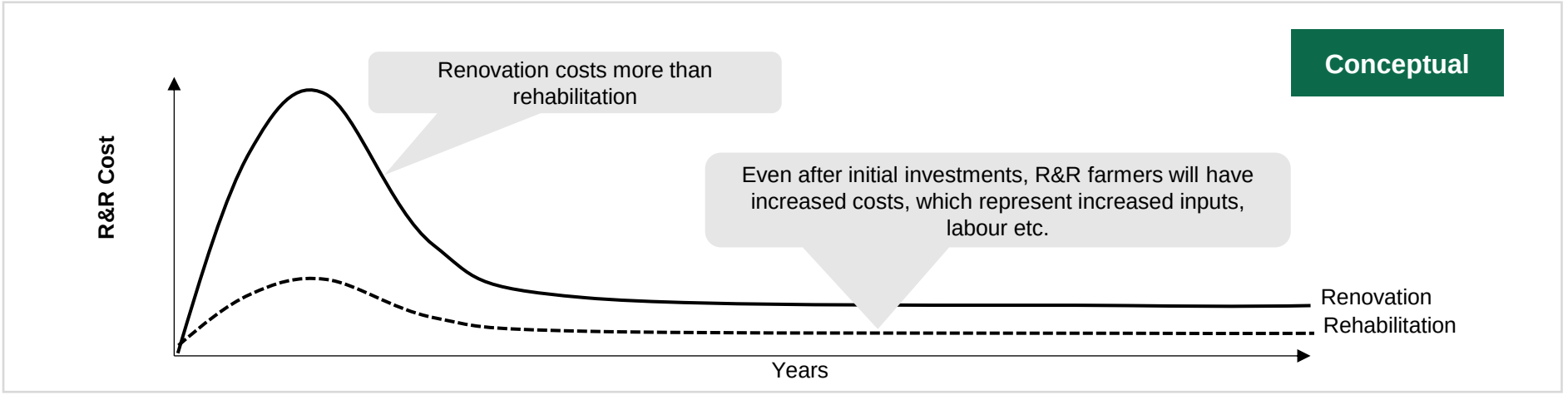


High stumping

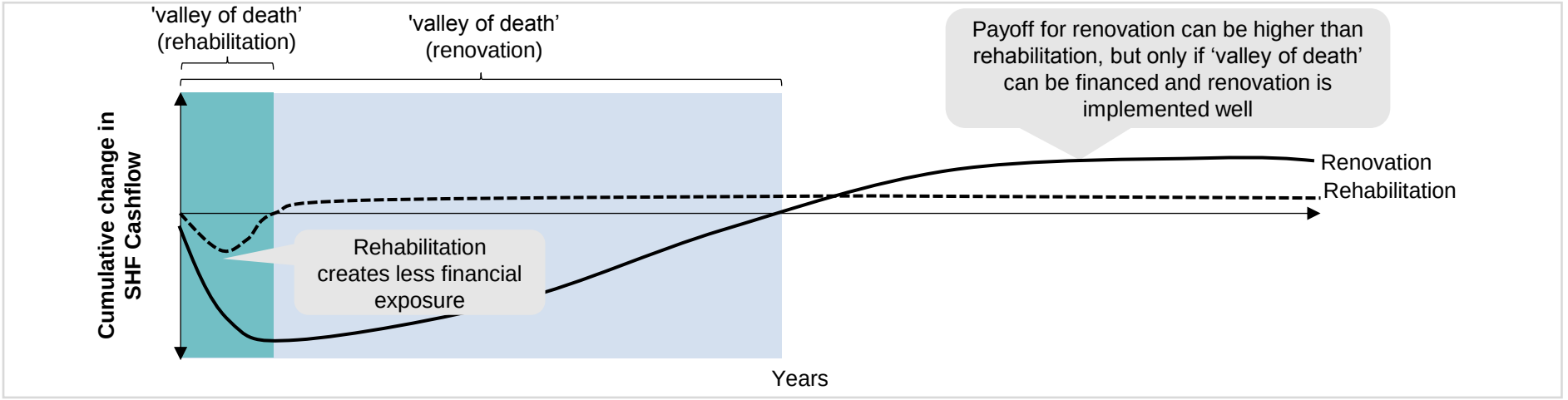
Notes: Illustrations are from: ACOP, *Producer training project: Sustainable Technologies to Boost Productivity, Resilience to Severe Climate, Coffee Quality, and Livelihoods of Brazilian Coffee Farmers,* 2017

Over time, R&R can deliver a net benefit to the farmer, despite a short term loss of yield and income

1 Rehabilitation and renovation require material upfront investments …



2 …but after the 'valley of death', cumulative cashflow for the farmer can be positive



At the farmer level, tree age, diseases and pests, poor agricultural practices, and climate change are the key drivers of R&R need

Old tree age: With time, trees produce less coffee. At some point they can no longer be rehabilitated back to profitable yields and therefore need to be replanted[1]

Diseases and pests: Some mild diseases and pests can be overcome without replanting (e.g. by having well-managed trees), whereas more severe outbreaks can necessitate replanting (with new resistant varieties)

Climate change: Increasing temperatures can demand replanting with drought/disease-resistant varieties, or varieties that are particularly suited to yield in certain climatic conditions

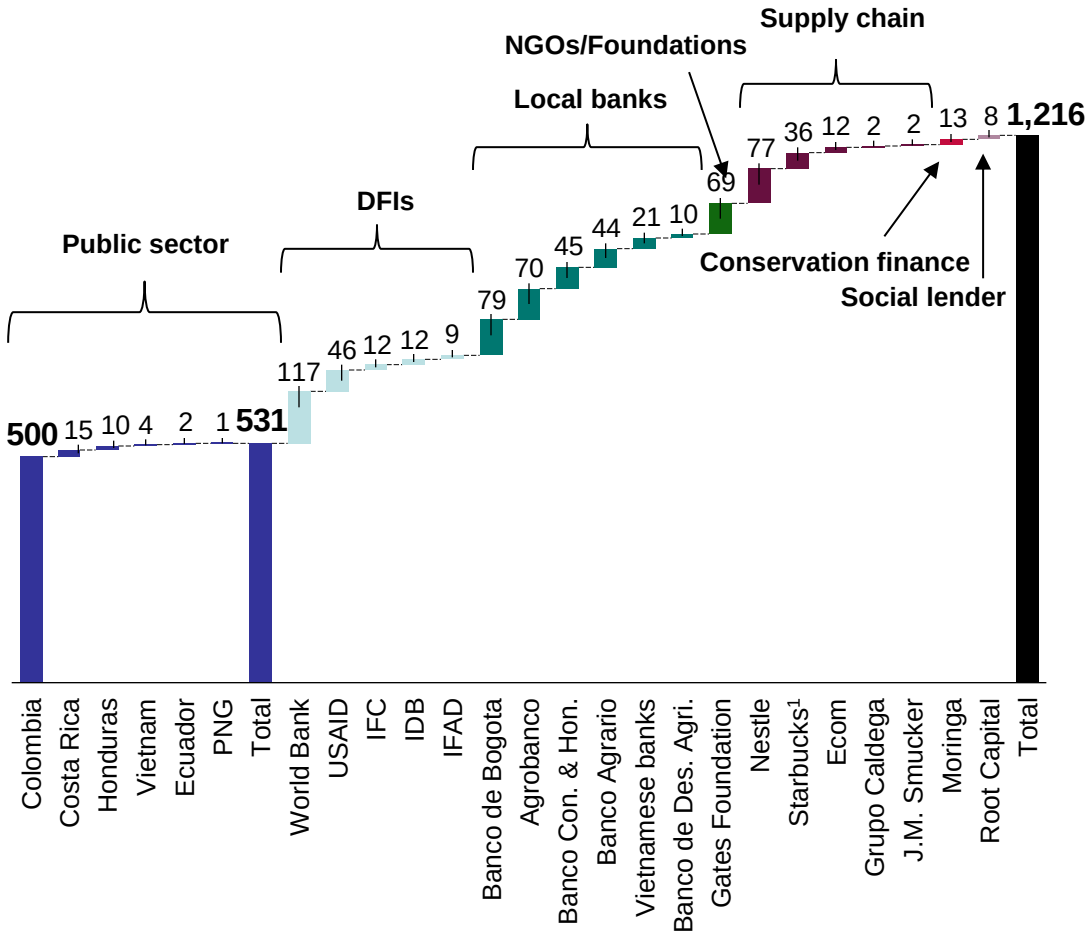
Poor agricultural practices: Poor agricultural practices can lead to the deterioration of trees to the point where they require R&R. It is important that R&R is *always* accompanied by GAP to prevent the same decline from happening again

Global need for smallholder R&R is 4 million hectares: equivalent to the entire harvested area of Brazil, Vietnam, Colombia and Ethiopia.

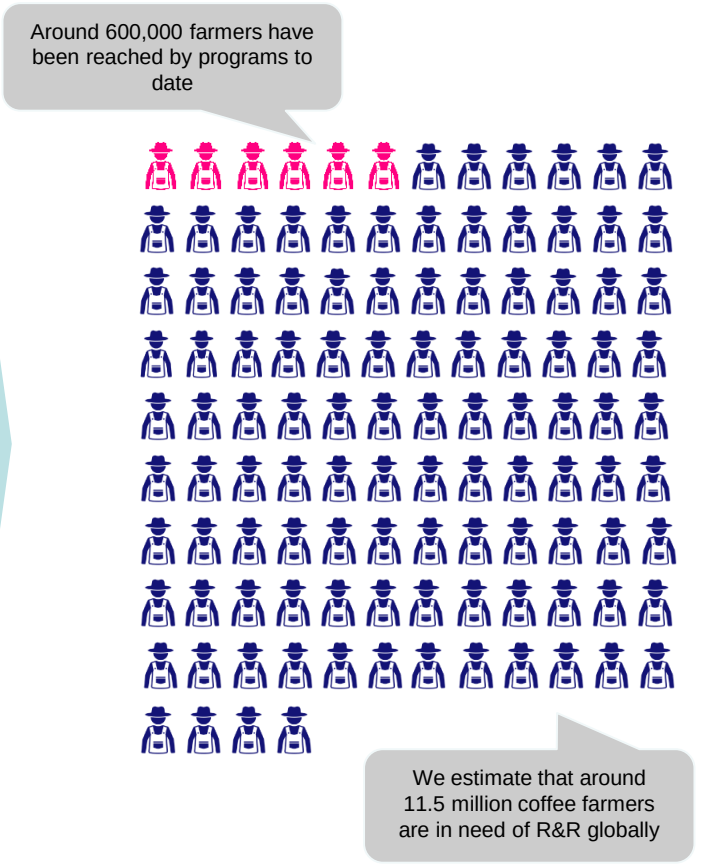
Notes: (1) The exact age when this happens varies enormously and depends (among other things) on SHF' current agricultural practices. As a general rule, replanting should not be considered before trees are 20 years or older, assuming that they are otherwise healthy and well-managed, though some trees might perform well much longer than that.

Governments and actors in coffee value chains have invested USD 1.2 billion in R&R so far, but this has only met around 5% of the smallholder farmers in need

R&R investments to date - channeled by finance providers (non exhaustive estimate)
USD millions



Estimated number of farmers reached by past and current R&R programs



Notes: (1) USD 4 million of Starbucks' commitment overlaps with Root Capital. Source: Dalberg analysis. See full Guidebook for notes and methodology

If we did reach the farmers in need of R&R, benefits would include more coffee, higher incomes for farmers, and reduction in future deforestation

There is a significant need for R&R across the SHF world…

…entailing that global production could grow significantly…

…which would mean more value to farmers…

…and fewer trees cut down for otherwise new, expanded, plantations

50%

More than 50% of the seven million hectares of global SHF coffee land could benefit from R&R

5-20%

Global production could increase between 5-20% if R&R is applied to all land in need

1-3B

Farmers could accrue between USD ~1-3 billion at farmgate prices through increased coffee sales per year

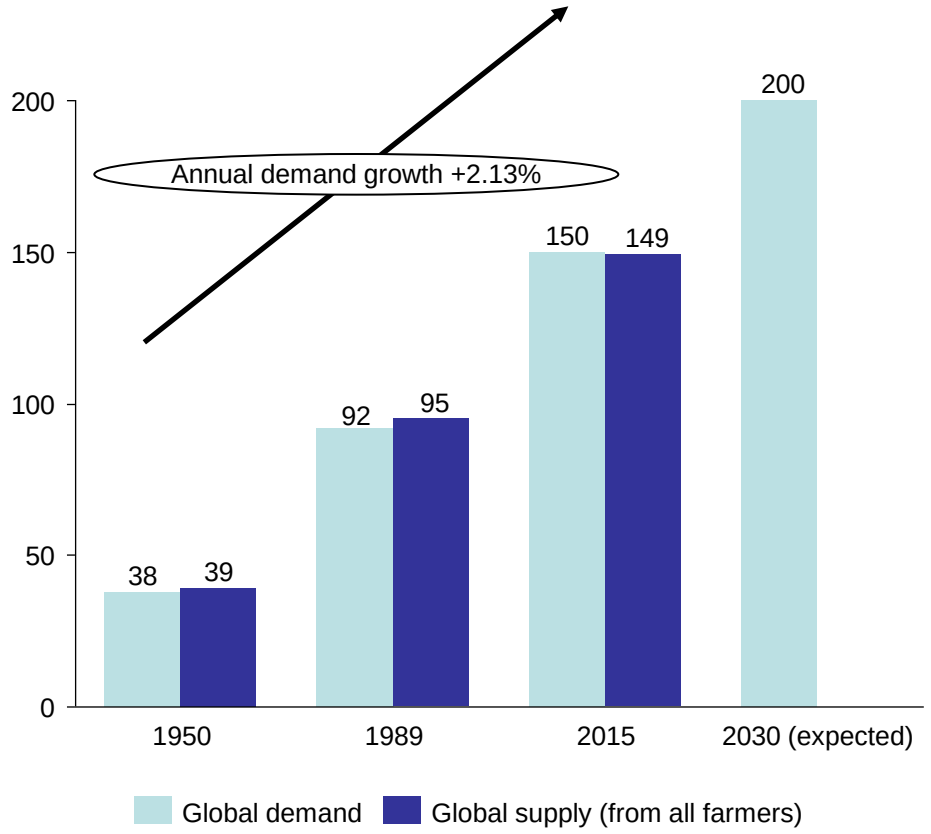
1-3M

Without R&R, a similar increase in yields and value would require an expansion of coffee land onto ~1-3 million hectares of new land under current yields

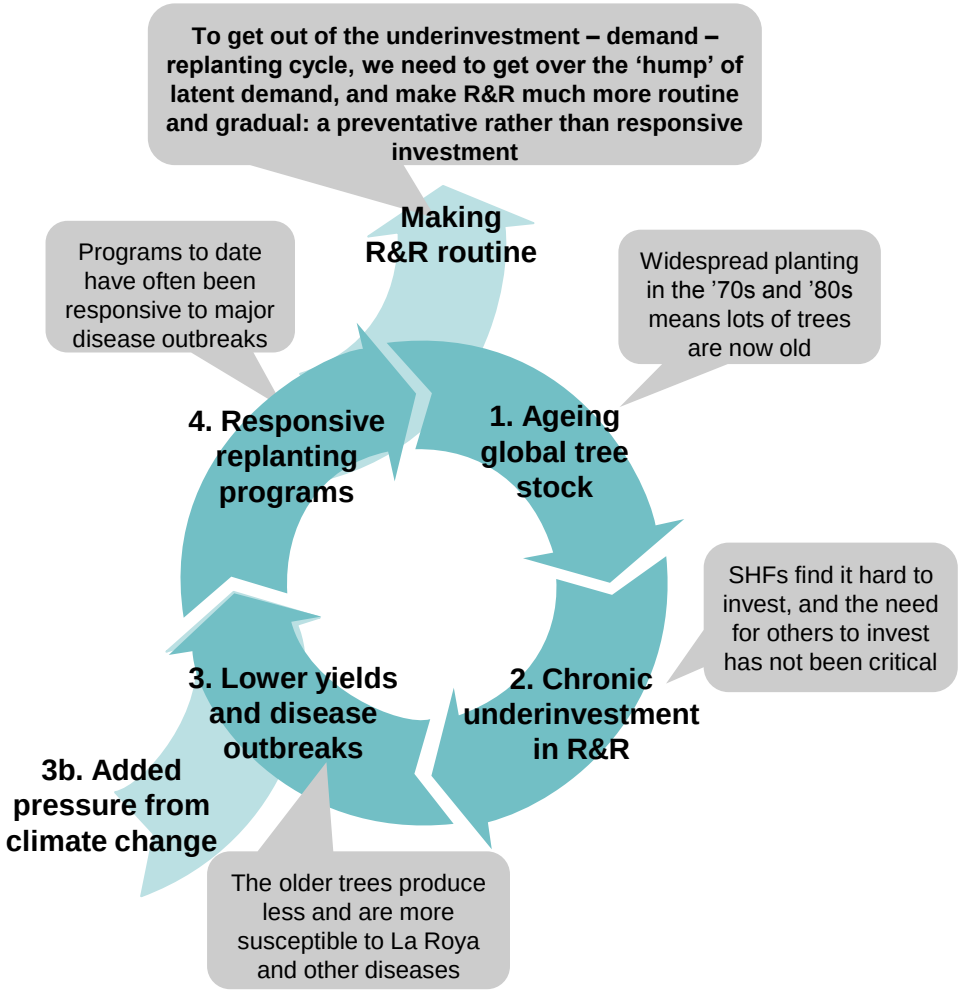
Source: Dalberg analysis. See full Guidebook for notes and methodology

Meeting this R&R need will be crucial to securing coffee supply for 2050 and beyond – especially in the light of increasing global temperatures

Global supply has met demand to date



But a real push on R&R will be needed to meet coffee demand for 2050, given an aging tree stock and additional pressure from climate change



Source: Dalberg analysis. See full Guidebook for notes and methodology

But there are no current ‘quick fixes’ to R&R– not for farmers, nor for actors who implement R&R programs

For R&R to work, you have to align the **farmer-level perspective**

With strategic and operational considerations from other stakeholders in the value chain and beyond

Viability for farmers

- “How can I afford to take on a loan when I have school fees, and other commitments?”
- “Can I afford to be without that much income for 2-3 years?”
- “If the price of coffee changes, will I actually earn more than I do now?”

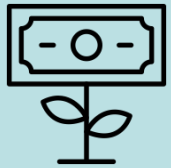
Attractiveness of R&R vs. alternatives

- “Should I risk the increased cost and risk of R&R for potential additional benefits, or simply avoid the risk and rely on my current yields?”
- “Should I focus more on coffee and do R&R, or are other crops/economic activities better for me currently and in the future?

Operational feasibility

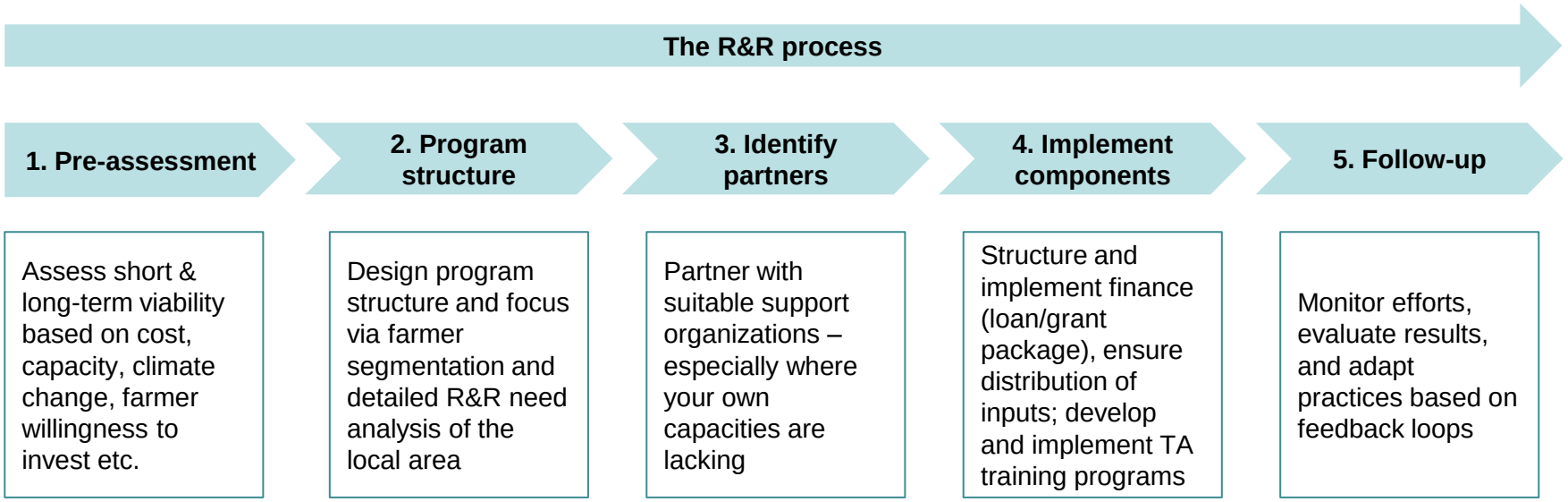
- “How do I reach these farmers? Is there a cooperative I can work through?”
- “And can the nurseries provide seedlings at the quality and volume I need?”
- “Who can I partner with to make this work?”

Investor Feasibility



- “Is a return on my capital desirable? Feasible?”
- “How do I assess risk, when there’s so little track record of long term lending to these farmers?”
- “How do I reconcile that those with the most need, are also the hardest to reach and riskiest to lend to?“

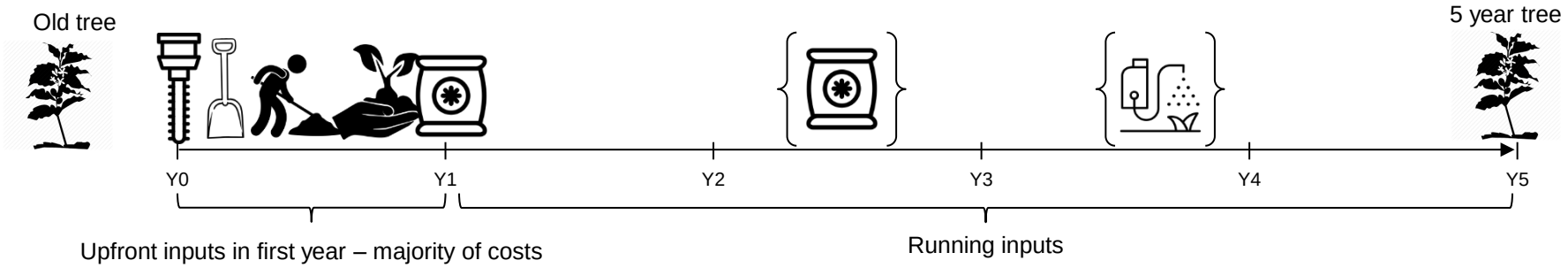
Looking at the issue top-down, there are five central steps to a successful R&R program



- **Step 1 and 2 are determined via the R&R 'decision tree'** which helps stakeholders identify the viability of coffee, the different farmer segments, farmer bankability and capacity to conduct R&R, as well as the detailed R&R need in a particular group of farmers
- **Step 3 will vary depending on the lead actor's network and specific geographical context**
- **Step 4 requires a detailed tailoring and implementation of the three project components (inputs, finance, knowledge)**
- **Step 5 is essential for future learning and adaptation to changing circumstances**

And we are getting much better at knowing how to do R&R well (and what not to do!)

Indicative renovation project timeline



Inputs

Tools, labour, planting material, and nutrition are crucial

Knowledge

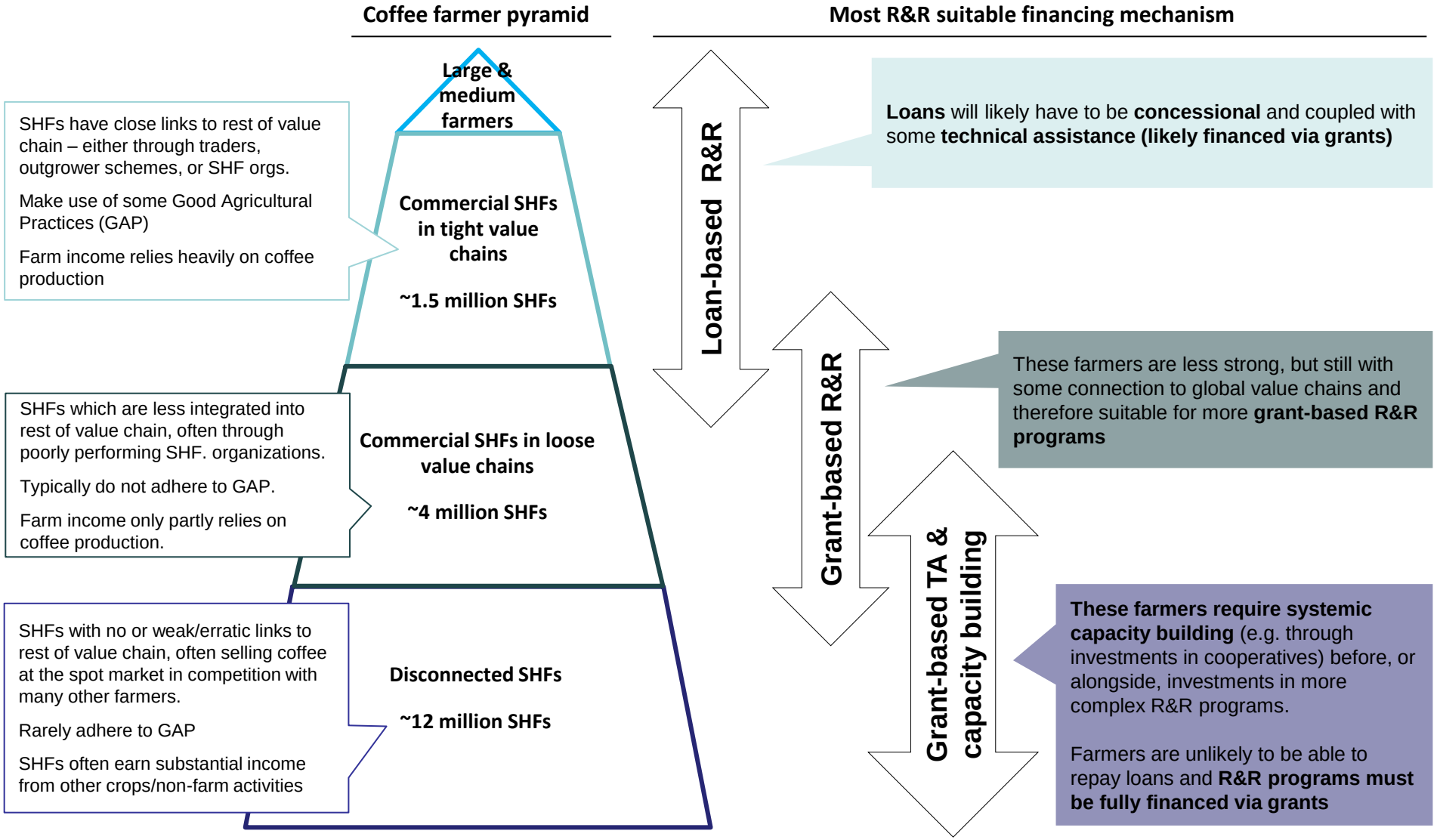
Technical assistance is a continuous process that is relevant for SHFs *and* R&R supporting organizations such as cooperatives, nurseries, and local banks

Finance

Often grants, but sometimes loans too, depending on on whether the R&R investment is 'bankable', and whether mitigation measures can decrease risks and operational costs sufficiently

Conceptually, these program components are very simple to outline. However, they can be very complicated to deliver effectively: there is a growing body of evidence on exactly how each should be delivered, and what partnerships support success

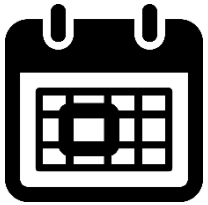
For example, concessional loan R&R programs are better suited to the top of the farmer 'pyramid', while grants are better suited to the bottom and middle



Source: Dalberg analysis. See full Guidebook for notes and methodology

But business as usual will not meet the more than 10 million smallholder farmers in need across the globe

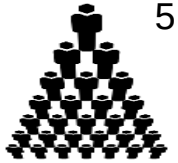
Current efforts have fallen short and not targeted the farmers most in need



1. 40 R&R projects focused on SHFs to date have only met 5% of the farmers in need
2. These projects have all have been concessional in financing; many have been philanthropic
3. Most programs have targeted the slightly less risky, bigger and better connected farmers

This is not enough

4. There is a limit to how much concessional or philanthropic finance is available. It will not get us to all the farmers in need



5. Those farmers at the 'bottom of the pyramid' who have been less reached, have the greatest need for R&R, and the most to gain

<u>The future must be both 'more', and 'different'</u>

More effort is needed: more investors, more delivery organizations; more study of what works, more sharing of lessons learned

Innovations in finance and delivery are needed to significantly de-risk R&R to the point where it is much more appealing for farmers themselves, and for more commercial capital

A natural starting point is for value chain players to start (or expand) R&R activities with their own farmers

Value chain actors are well positioned to start/expand their engagement in R&R…

…There are a number of benefits for those that take action…

- Increased security of supply
- Closer links with farmers
- Social impact – improving farmer livelihoods
- Environmental impact: decreasing deforestation
- Increased licence to operate in a given country
- Brand value/PR/reputational risk management

…and this Guidebook can help you get started (or adjust your approach if you are already investing)

- Section 3.1 outlines a number of questions on coffee viability, farmer segmentation and detailed R&R need that will help you engage with your own farmer supply base
- These questions can also help refocus and adjust your approach if you are already engaged in R&R
- Depending on your size, you may need to partner with actors in your supply chain, as well as R&R support organizations

Further, this Guidebook identifies seven major needs for the R&R sector, from scaling up existing approaches, to laying the foundations for future R&R

Expand current programming models.
Current programs work well at reaching certain types of SHFs and with 90% of the R&R need unmet, there is a clear and important need to scale up existing programs

Fill data gaps on R&R need, and farmer segmentation
Data on R&R need is scarce globally, often based on expert estimates of how many SHFs there are, and what their links to markets are. Implementers must share lessons learned more widely

Innovate in delivery to dramatically reduce costs
R&R costs vary significantly across countries, but will need to be dramatically reduced for R&R to become feasible for farmers at the 'bottom of the pyramid', including:

- Re-think how inputs are delivered
- Explore if there are lower cost options of delivering the technical assistance at scale

Innovate in finance to leverage commercial capital, and to reach farmers further down the pyramid

- Blended finance models are needed to bring in commercial capital – essential for scale
- Innovations in de-risking lending are needed for the sector to provide returnable capital to farmers who are now only reached through grants

Better understand possible rehabilitation outcomes
The choice between renovation and rehabilitation is not always clear, but renovation has received the majority of the attention, with more projects/investment, and more data on outcomes. Rehabilitation has lower costs and risks, and the sector should seek to better understand what outcomes can be driven through rehabilitation and how often this is 'enough'.

Build R&R support systems by strengthening coops, nurseries, local banks, research institutes etc.
For many countries, the constellation of actors needed for successful R&R is not present and/or capable. These longer term, system-building investments are not glamorous, and hard to justify for value chain partners, but they are nonetheless essential for future R&R efforts

Join others in advocating to governments for the value of R&R
And for best practice in delivering R&R. Governments' budgets and inclusive focus mean their R&R investments can target those farmers that others struggle to reach

For some combinations of actor and need, the business case is clear: the text boxes below represent great places to start

Areas for increased R&R action – by type of actor and R&R need

R&R need	Roaster/trader/ retailer	Financial institution	Donor	SHF support organization/ NGO	R&D Center/ University	Government
	Clear need to expand programming using existing models – almost always in partnership with other actors Should use decision tree-type analysis to target programming					Yes – where coffee is a key part of the economy
	Scale up sharing of lessons learned and data from programs for the benefit of entire sector				Continue to do research and experimentation	
	Larger players could devote some resources to experimental programming		Ability to focus on non-financial definitions of success is a strength here			
		Key role here, for donors, DFIs, social lenders, and local banks to innovate in financing structures				
	Should use decision tree analysis to understand where rehabilitation might be the right choice				Do more research on benefits of rehabilitation versus renovation	
	Relevant for larger actors who can justify programming without tangible benefits back to the business		Focus on public goods that is not always feasible for the private sector	Relevant where there are specialist skills e.g. cooperative strengthening		Focus on public goods that is not always feasible for the private sector
	Significant opportunity – governments are the biggest investors in R&R and can reach the whole pyramid: catalyzing government action would be excellent leverage on others actors' resources					

Find out more, find partners, and become part of the movement

1. **Read this Guidebook to find out much more** about R&R: More than 130 pages packed with details on how to choose between renovation and rehabilitation, what lessons we have learned on delivery, how to finance R&R, and more….

2. **Share your ambitions, and plans. Find partners. Share what worked and why? Share what did not.**

3. **Join the Sustainable Coffee Challenge**: join the Collective Action Network on R&R

SUSTAINABLE COFFEE CHALLENGE

Contents

Overview of Section 1: Introduction to R&R - What is it, why is it needed, and why is it difficult?

What is covered in the section?

- **The objective of Section 1** is to introduce the reader to key concepts, dynamics and barriers to R&R as well as to analyze past/ongoing efforts
- **The section defines R&R**, including the different techniques, and shows, through yield curves, why and when R&R is typically needed
- The section also **introduces the most common barriers to R&R**

What are the main takeaways?

- **There are two main R&R techniques:** Renovation, which refers to replanting or infill planting, and rehabilitation, which refers to stumping or rejuvenation pruning.
- **R&R is driven by four factors:** tree age, diseases and pest, climate change, and poor agricultural practices
- **SHFs are primarily prevented from doing R&R because of its high cost and risk**, while program implementers face a number of operational risks/costs

Key concepts

- **Renovation:** Refers to addition of planting material on the field, either in the form of replanting coffee trees or inserting coffee trees/shade trees
- **Rehabilitation:** Refers to increasing tree productivity by pruning or stumping the tree
- **Good Agricultural Practices (GAP):** Economically, socially, and environmentally responsible farming methods that aim to maximize yields under the given conditions while producing safe crops for consumers
- **Yield curve:** A graph depicting the yield of a tree/farm given the age of the tree and the use of certain agricultural practices
- **Valley of death:** The period right after R&R where trees don't yield and farmers therefore don't earn income
- **Drivers of R&R:** The key factors that drive the need for R&R (age, disease/pest, climate change, poor agricultural practices)

Definition: Renovation and Rehabilitation (R&R) are methods to improve the productivity of coffee trees

Renovation	Rehabilitation
Addition of planting material	***Increasing existing tree productivity***
• **Replanting:** replacing existing trees with new planting • **Infill planting:** new planting within existing land to densify trees or to provide shading	• **Stumping:** cutting down trees to the stump • **Pruning:** Significant trimming of trees[1]

Require:

Finance
Upfront investments that deliver (potential) long term productivity uplifts

+

Inputs
Seedlings (for renovation), nutrition, tools, labour, etc.

+

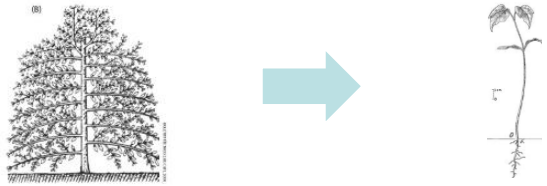
Knowledge
Knowledge of good agricultural practices (GAP), long-term financing, soil analysis etc.

Notes: (1) we focus on rejuvenation pruning (e.g. stumping of lateral shoots, not clipping of vertical shoots) rather than annual pruning of branches which is considered a good agricultural practice

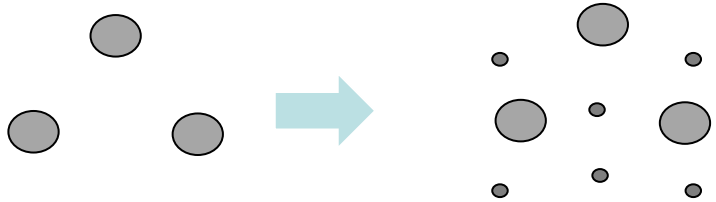
Definition: There are different methods to R&R that each respond to particular tree and plot conditions

Renovation

Replanting: Entails uprooting the old tree, preparing the soil for a new seedling, planting the seedling and having it grow to full size. Generally requires trees being too old/sick to be rehabilitated. Sometimes replanting also involves planting shading trees between the existing/newly planted coffee trees.



Infill planting: Entails planting new trees among existing trees to increase the density of trees on the plot – same method as replanting. Only relevant for plots with low density of trees. Sometimes infill planting also involves planting shading trees between the existing/newly planted coffee trees.

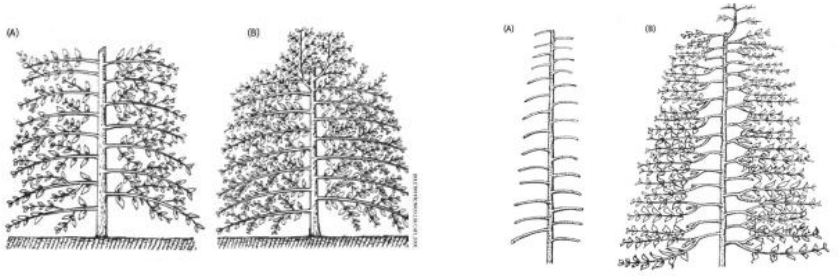


To an existing plot

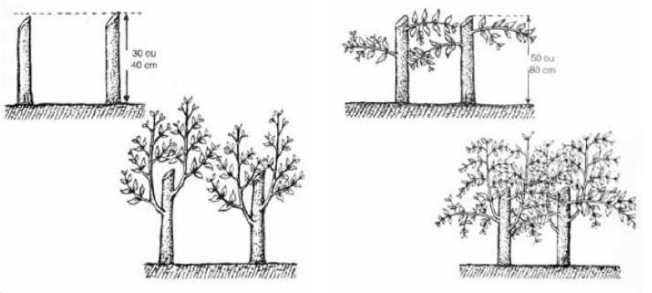
Add new seedlings and/or shading material

Rehabilitation[1]

Pruning: Can be done on a top only approach, cutting away just the top of tree, or a top and sides approach. Generally only relevant if the 'architecture' of the plant is still strong.[2]



Stumping: Can either be done as down stumping: cutting down the stump until 30-40cm, or high stumping: cutting down the stump to 50-80 cm with some branches still left on the tree. Generally only relevant for coffee trees that still have vitality and a strong root system.



Notes: (1) Descriptions and illustrations refer to: ACOP, *Producer training project: Sustainable Technologies to Boost Productivity, Resilience to Severe Climate, Coffee Quality, and Livelihoods of Brazilian Coffee Farmers,* 2017. (2) Again, This Guidebook primarily focuses on rejuvenation pruning that cuts away significant pieces of the plant and prevents the plant from yielding substantially for at least one year.

At the farmer level, tree age, diseases and pests, poor agricultural practices, and climate change are the key drivers of R&R need

What drives the need for R&R?

Old tree age: With time, trees produce less coffee. At some point they can no longer be rehabilitated back to profitable yields and therefore need to be replanted[1]

Diseases and pests: Some mild diseases and pests can be overcome without replanting (e.g. by having well-managed trees), whereas more severe outbreaks can necessitate replanting (with new resistant varieties)

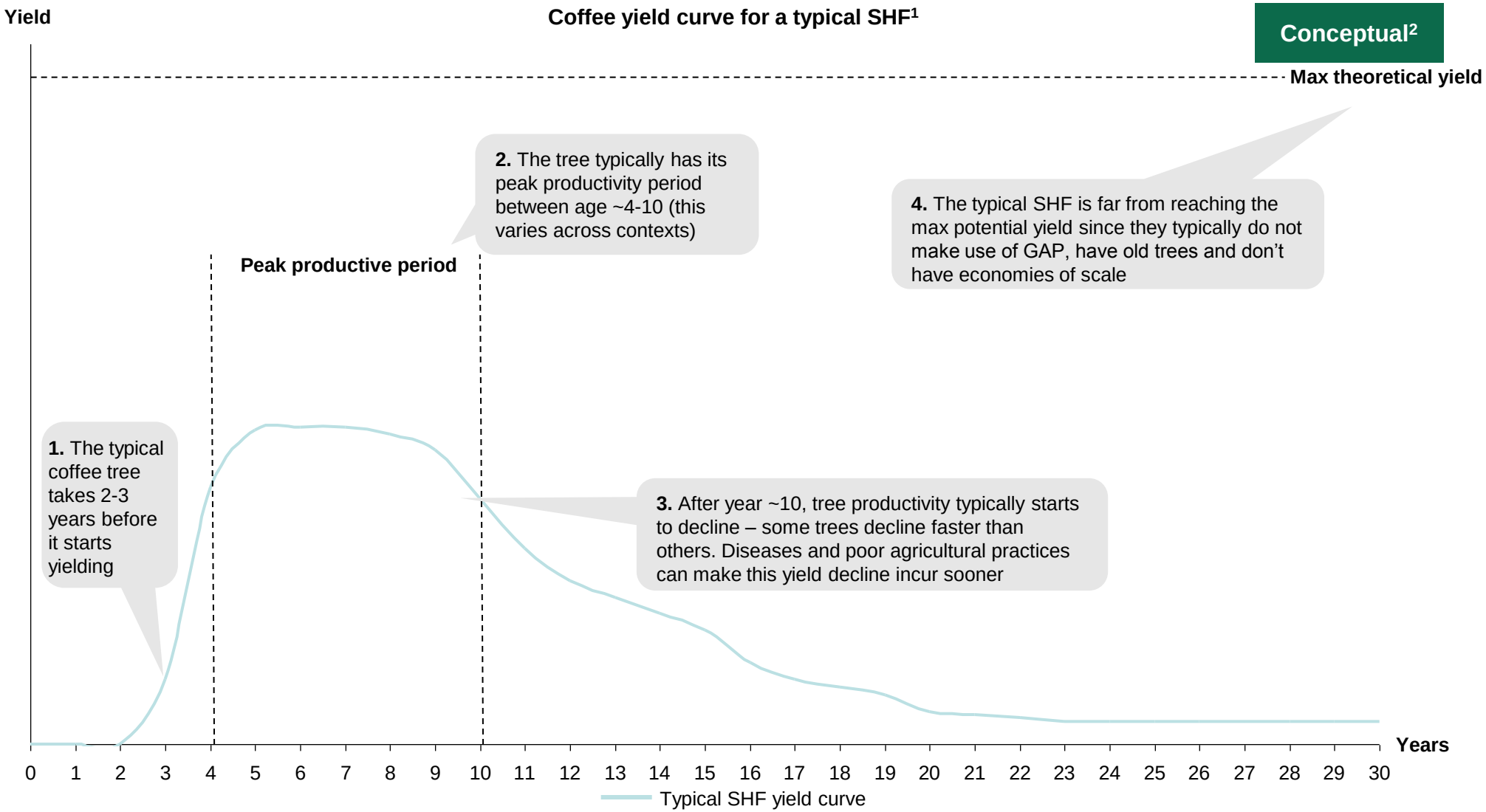
Climate change: Increasing temperatures can necessitate replanting with drought/disease-resistant varieties, or varieties that are particularly suited to yield in certain climatic conditions

Poor agricultural practices: Poor agricultural practices can lead to the deterioration of trees to the point where they require R&R. It is important that R&R is *always* accompanied by GAP to prevent the same decline from happening again

In general, if these drivers are not too severe, rehabilitation is the best option. However, in some cases, only renovation will do. These dynamics are complex, and are explored in more detail in Section 3.

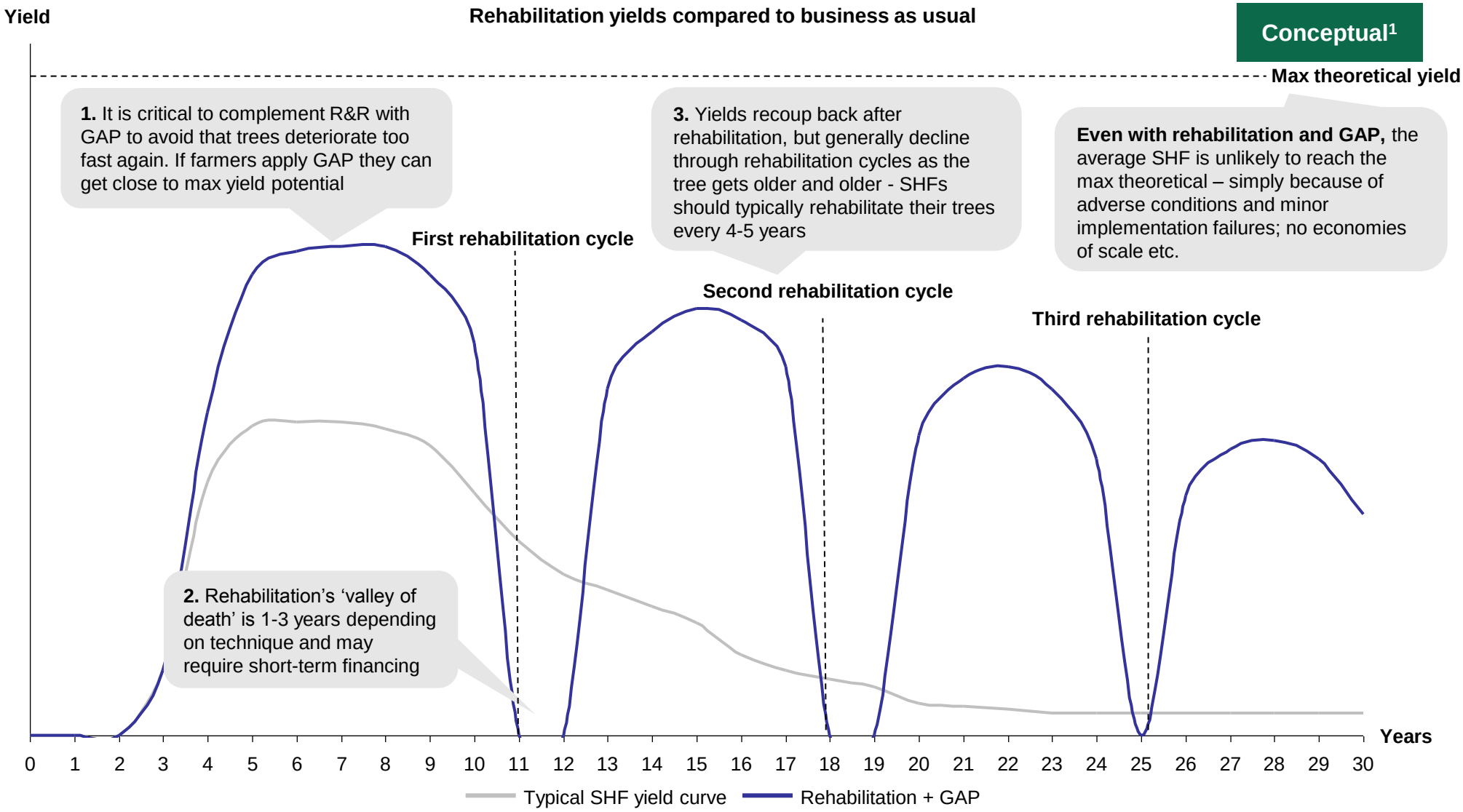
Notes: (1) The exact age when this happens varies enormously and depends (among other things) on SHF' current agricultural practices. As a general rule, replanting should not be considered before trees are 20 years or older, assuming that they are otherwise healthy and well-managed, though some trees might perform well much longer than that. Sources: Dalberg interviews

R&R can improve the productivity of old, disease-stricken, and/or poorly-yielding coffee trees



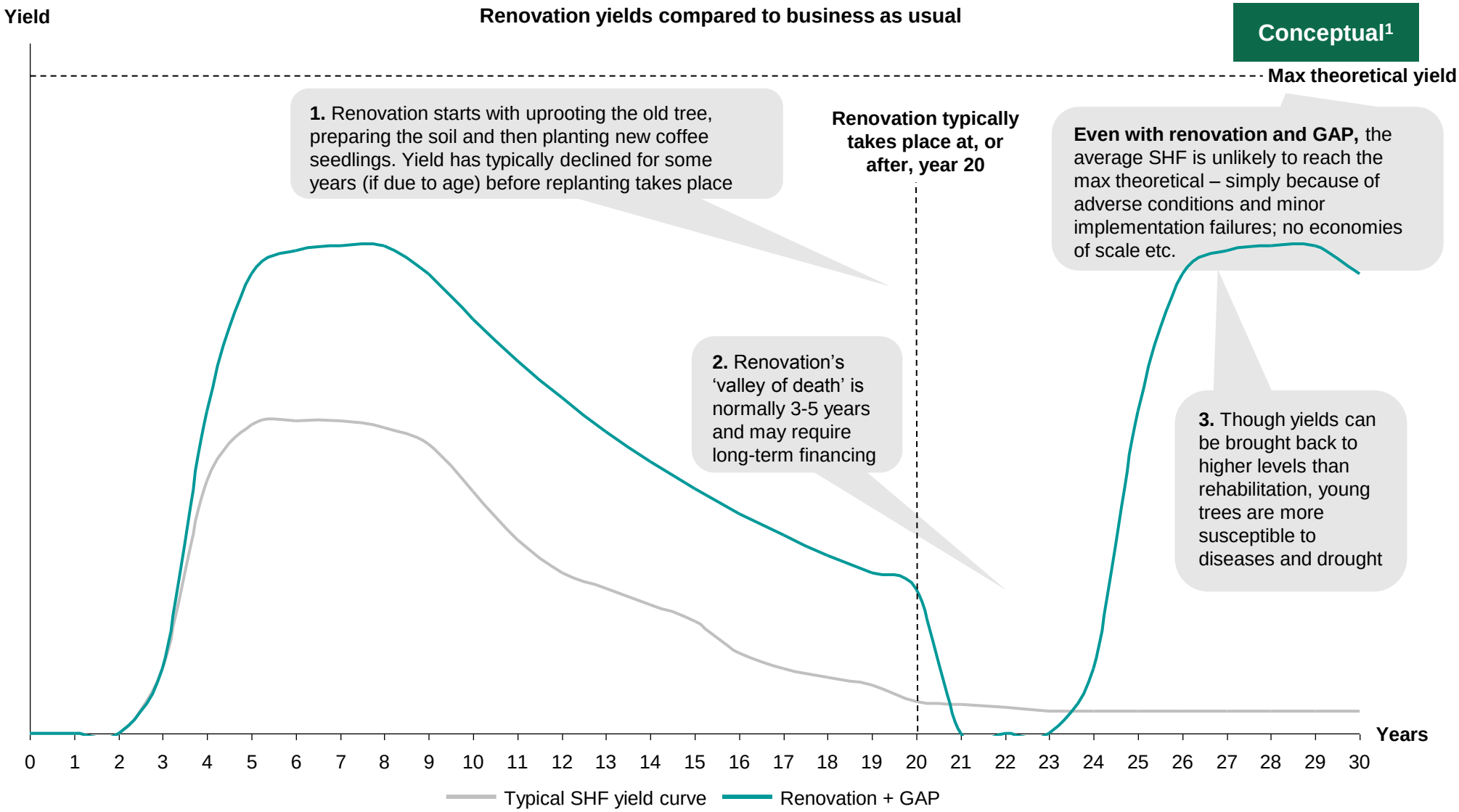
Notes: (1) We assume that the typical SHF is far below the potential yield that can be reached in the given area and with the given variety. This is mainly a result of not using good agriculture practices but also based on that SHFs are limited in reaching economies of scale. (2) These yield curves are conceptual only and do not represent actual/observed yields. Tree yields differ between Robusta and Arabica (Robusta typically has higher yields than Arabica, but Arabica has higher cup quality), and local climatic and soil conditions, as well as farmer agricultural practices. Sources: Dalberg analysis and Dalberg interviews

Rehabilitation is normally conducted after the peak productive period and can help recoup yields after each pruning/stumping cycle



Notes: (1) These yield curves are conceptual only and do not represent actual/observed yields. Tree yields differ between Robusta and Arabica, and local climatic and soil conditions, as well as farmer agricultural practices. Sources: Dalberg analysis and Dalberg interviews

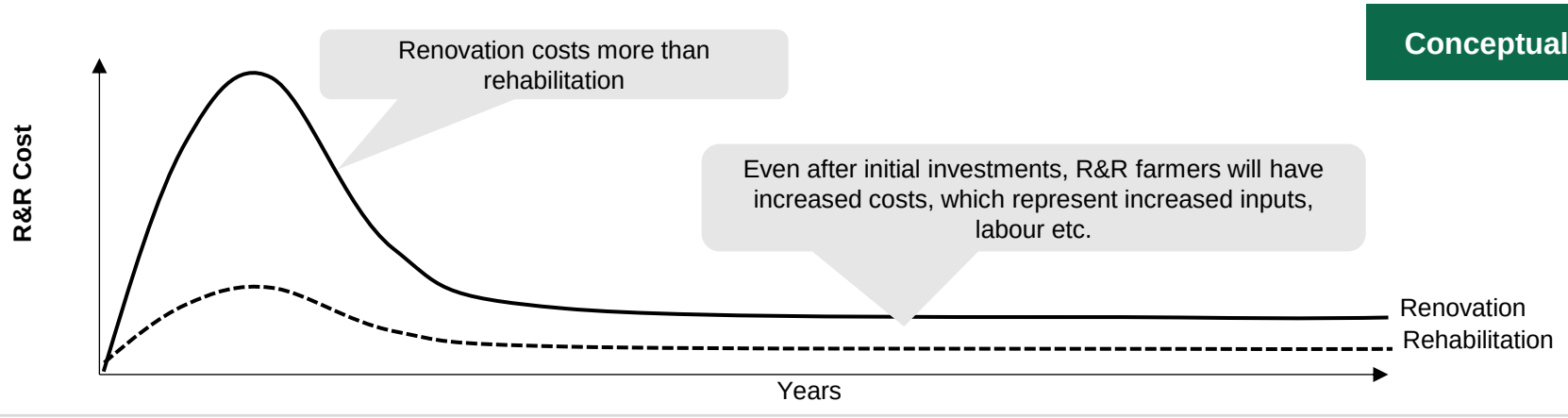
Renovation can bring back high yields, but the farmer has a longer period without income, and it comes with bigger implementation risks



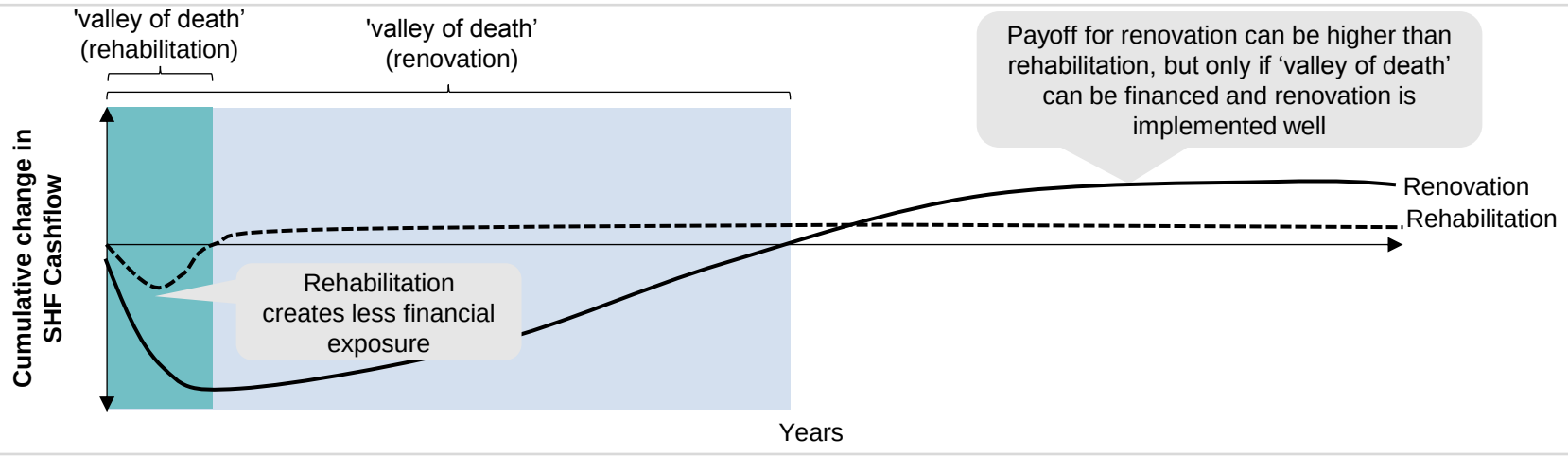
Notes: (1) These yield curves are conceptual only and do not represent actual/observed yields. Tree yields differ between Robusta and Arabica, and local climatic and soil conditions, as well as farmer agricultural practices. Sources: Dalberg analysis and Dalberg interviews

The different yield curves imply that renovation both has higher cost, but also higher (potential) payoff if correctly financed and delivered[1]

1 **Rehabilitation and especially renovation require material upfront investments …**



2 **…creating a 'valley of death' period of negative cashflow which SHFs need to have covered (or cover themselves)**



Notes: (1) Similar to the yield curves, the individual cash flows for renovation and rehabilitation investments differ between R&R techniques, R&R costs, achieved yields after intervention, and financing methods. Source: Dalberg analysis

While large scale farmers can systematically invest in R&R, a number of barriers prevent SHFs from doing (gradual) R&R

Type of Barrier	Examples
Viability for farmers 	• **High cost of R&R and lack of access to finance:** The cost of rehabilitation, and especially renovation, is too high for SHFs. In most cases, SHFs do not have access to (affordable) finance that can help cover the upfront costs and valley of death. • **Reduced / no income period:** The 'valley of death' period is unbearable for SHFs with no savings to cover lost income (or alternative livelihoods to earn income) while coffee trees grow (back) to high yields. • **Exposure to coffee price risk:** Coffee prices, like other unregulated commodities, variate significantly and farmers most often do not have access to futures contracts. Price floors (e.g. via certified coffee) are often below the realized farm-gate price.
Attractiveness of R&R vs. alternatives 	• **Other farm strategies might be preferable:** There is not necessarily a connection between higher yields and profitability, since increased yields also come with increased production costs.[1] In some cases, SHFs can increase profitability by decreasing inputs and production costs. • **Other crops or income activities might be preferable:** In some cases, the (perceived) profitability of coffee production might be low compared to other crops – or even selling the land. There are also examples of SHFs choosing to abandon the land in pursuit of other income generating activities.

INSIGHT

Some of these barriers only pressure SHFs in the *short-run.* SHFs could invest in gradual R&R and thereby greatly decrease the risk and cost of R&R, but recent periods of depressed prices and ongoing price volatility prevent SHFs from investing in gradual, long-term, R&R

Icons under creative commons from www.thenounproject.com

Sources: (1) RD2 Vision, *Production costs and profitability of coffee growing: A synthetic review,* 2016; Dalberg interviews

Farm level R&R investment decisions are highly complex and personal given farmer needs and preferences

There are often intricate, but important, differences between R&R needs for individual SHFs. Some SHFs will be more severely struck by diseases and pests (e.g. coffee rust, swollen shoot virus, mould, nematodes) than others, while some will have an older tree stock. Some will invest slightly more in fertilizers and other inputs and therefore have higher yields. However, high current yields also mean less potential for yield improvements which would make R&R less attractive. All of these differences determine whether R&R makes economic sense for the individual farmer.

The timing of *when* to conduct R&R is especially important, but there is rarely a 'perfect' time to invest. There are both objective and subjective factors (sometimes counterweighing) that determine SHF willingness to invest in R&R. Objective factors include the uncertainty of future coffee prices and production costs, and whether it therefore makes sense to do R&R. Subjective factors relate to perceived risks and gains from investing at a certain moment. For example, high coffee prices could impede R&R investments because SHFs might not want to 'lose out' on current prices, while low coffee prices might entail that SHFs do not have the capacity to invest even if they wanted to.

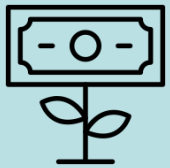
Ultimately, it is important to stress that R&R decisions should be taken by SHFs themselves, with support from other stakeholders as needed. Interviews stressed that farmers should be involved in the decision making of R&R programs – even if funds come from downstream value chain actors. This does not entail that actors cannot set up requirements for SHFs[1], but rather that SHFs should have a choice whether to participate in a program or not. Ideally, SHFs should be presented with multiple options to allow the individual farmer to make the investment most tailored to her/him. SHF orgs. and value chain actors should help inform SHFs on the different trade offs of renovation versus rehabilitation, and versus increasing practices only and continuing as usual.

R&R programs must have a "social safeguard": Farmers should be able to participate knowingly and voluntarily without being forced into top down initiatives
(See case One Tree for Every Bag Commitment)

And If possible, interventions should be conducted on a gradual basis, with the SHF replanting or rehabilitating around 10-20% of the land every year. The biggest, though not the only, barrier preventing R&R investments is lack of finance. Most SHFs do not have access to affordable and appropriate finance that can help cover the 'valley of death' that takes place while a new or stumped/pruned tree grows to maximum yield. To overcome this barrier, SHFs should conduct R&R on a gradual basis, and focus on replanting or rehabilitating 5-20 % of the land per year based on trees age, health and performance. This will significantly bring down the costs and allow farmers to (partly) self-finance R&R.

Notes: (1) For example, there might be a need to implement widespread renovation if there is a disease outbreak and the community as a whole needs to control potential host reservoirs for vectors (e.g. nematodes), since noncompliant SHFs can potentially affect all neighbours. Source: Dalberg interviews

Project implementers and investors also face barriers in supporting and funding smallholder R&R

Type of Barrier	Examples
Operational feasibility 	• **No availability of high quality planting material:** Seeds of a proven variety/quality are often not present locally and SHFs are forced to invest in seeds that they cannot verify. There are reports of SHFs buying fake seedlings. Importing seeds can be costly and take a long time. Many rust-resistant seedlings are not registered by governments and therefore illegal. • **High transaction costs of unorganized SHFs:** Serving unorganized SHFs is difficult since there is no aggregation point (such as a cooperative) to distribute funds and other inputs. • **Lacking knowledge of SHFs:** SHFs often lack agronomic knowledge on GAP on R&R. Some rust-resistant seedlings (e.g. Marsellesa) require specific planting instructions and fertilizer application which can be expensive
Investor Feasibility 	• **Exposure to commodity and agricultural risks:** Financing cash crop production is risky given the high number of inherent risks involved • **Asymmetric information & SHF risk assessment:** As a lender, it is difficult to conduct substantial assessments of SHFs since there is often little way to collect information on them systemically and efficiently • **Lack of SHF collateral:** SHFs often have no collateral to offer to lenders as guarantee • **Lack of institutional experience:** Lenders are not used to acting on long-term renovation basis and have little experience with financing R&R
Financial institutions 	
supply chain actors 	• **Side selling risks:** If finance is provided by roasters or traders, they have to be sure that increased production is sold to them, and not to other actors[1] • **Opportunity cost of tying up capital:** Supply chain actors have several competing investment concerns next to R&R – some supply chain actors may not see it as their responsibility to invest in R&R

Sources: Dalberg interviews

Contents

Overview of Section 2: R&R – Where are we now?

What is covered in the section?

- **The objective of Section 2** is to summarize past and current R&R efforts and situate the R&R debate in the context of the global coffee sector
- **Section 2.1. discusses the need for R&R in light of growing demand**
- **Section 2.2 analyzes** 40 past R&R programs, discussing which farmers they have targeted, the size of programs, the most common business models, and the most common financing instruments

What are the main takeaways?

- **Past R&R efforts have largely been symptomatic rather than focusing on root causes:** Most R&R efforts have been in response to severe disease outbreaks. Few efforts have focused on building preventive (and general) capacity for the farmers most in need, which constitute the majority of global farmers
- **Current efforts are unlikely to reach scale in time:** Smallholder trees are deteriorating and will continue to loose productivity without external investments.
- **Yet, despite past R&R investments of USD 1.2 billion globally, we have reached less than 10% of the farmers in need,** and the majority of these farmers have been reached by public programs
- **R&R investments must therefore be scaled up massively and target the bottom of the coffee farmer pyramid.** Efforts should not just include strict R&R programs, but also include capacity-building to help increase coffee viability in the long-run

Key concepts

- **Concessional loans:** Loans targeting below market rate returns e.g. loans offering farmers below-market interest rates) via grant support for lender operating costs
- **Grants:** R&R finance with no expected repayment/compensation
- **The farmer pyramid:** A segmentation tool for smallholder farmers that describes how well connected they are to global value chains and in turn, how easy they are to finance for project implementers

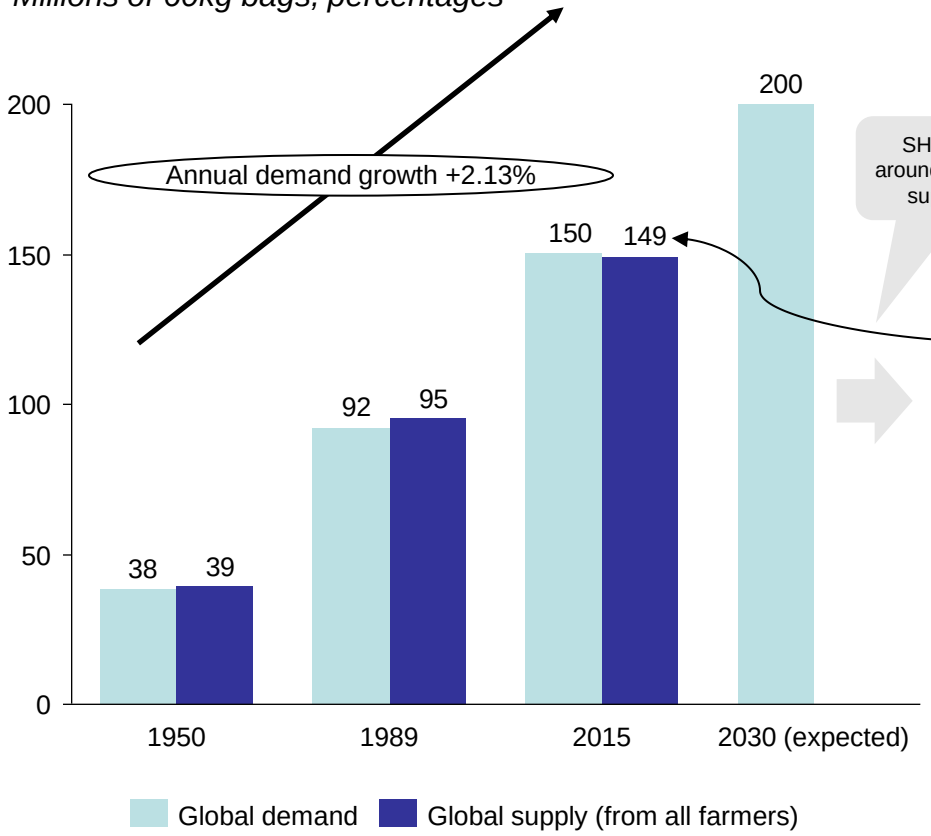
Global supply has so far met increasing demand, but a deteriorating SHF tree stock raises questions as to whether SHF supply can keep up in the future

Global supply has met or superseded demand in the past, despite a constant growing demand[1] for coffee

Yet, ageing SHF trees are likely to yield less, and some SHF production areas therefore risk becoming economically unviable

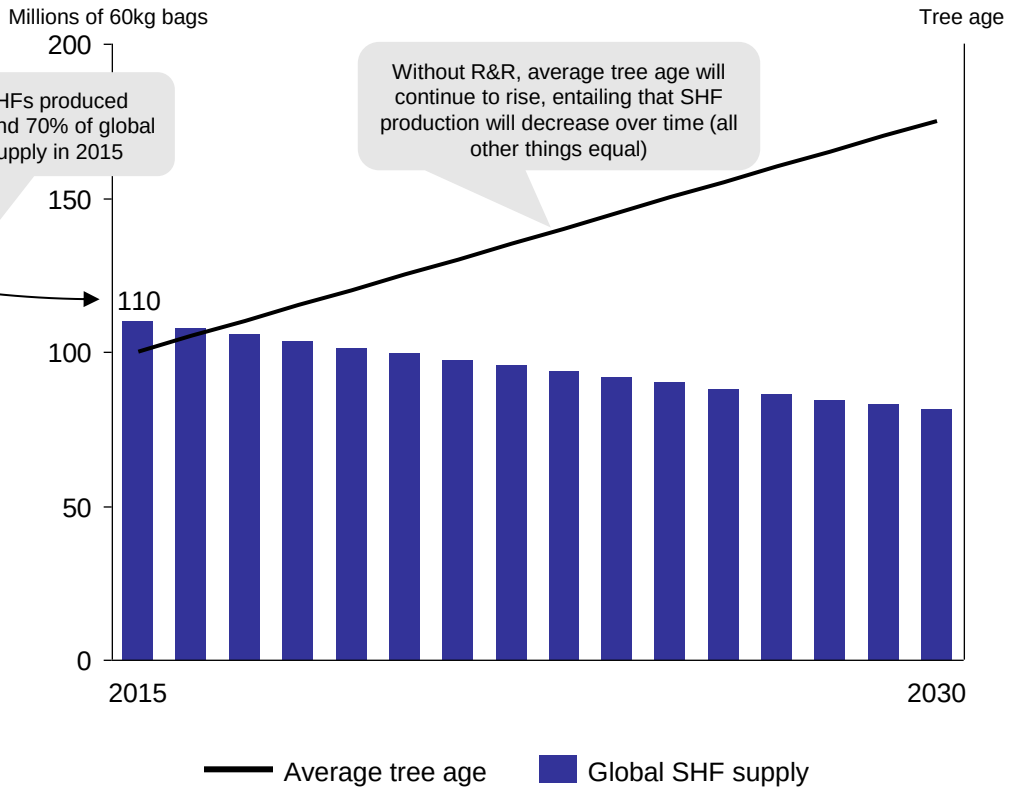
Historical and expected global demand and supply[2]

Millions of 60kg bags, percentages



Age of SHF tree stock and SHF global production

Conceptual[3]



Notes: (1) Fortune, *Americans' Coffee Guzzling Is Pushing Bean Prices Higher,* 2016; (2) Data from HRNS, *Michael R Neumann Presentation at Milano Expo September 2015,* 2015 (3) We were not able to collect systematic data on the age of SHF trees across all countries; Source: Dalberg analysis and interviews

Done well, R&R can raise farmer income, increase quality and security of supply, and minimize deforestation associated with coffee farming

There is a significant need for R&R across the SHF world…

…entailing that global production could grow significantly[2]…

…which would mean more value to farmers…

…and fewer trees cut down for otherwise new, expanded, plantations

50%

More than 50% of the seven million hectares of global SHF coffee land could benefit from R&R[1]

5-20%

Global production could increase between 5-20% if R&R is applied to all land in need[3]

1-3B

Farmers could accrue between USD ~1-3 billion at farmgate prices through increased coffee sales per year[4]

1-3M

Without R&R, a similar increase in yields and value would require an expansion of coffee land onto ~1-3 million hectares of new land under current yields[5]

Methodology for estimating global R&R need, yield uplift...

Note: (1) The choice between rehabilitation and renovation should be made on a case-by-case basis at the local level, hence this estimate does not differentiate between renovation and rehabilitation. (2) The yield uplifts rest on potential and/or assumed yield uplifts in each of the 19 country surveyed and does not differentiate between rehabilitation and renovation. The high estimates is based on countries reaching their full yield potential (as estimated by GCP and interviews), whereas the low scenario assumes 25% of that uplift, indicating that 75% of R&R fails – we have rounded to the nearest 5%. Note that potential yield uplift varies significantly from country to country and that many countries have the potential to achieve higher yield uplifts than the global average uplift (3) Data from FAOstat, *coffee production and land harvested,* 2014 (4) The potential increased value depends on average 2016 coffee prices which were low compared to historic standards. We have rounded to the nearest billion. (5) We have rounded to nearest million for this estimate. The range indicates the 100% to 25% yield uplift potential.

Contents

Five types of actors "lead" coffee R&R programs, while two other relevant types conduct R&R in palm oil and cocoa

NOT EXHAUSTIVE

Lead actor	Description	Definition of 'success'	Example
Financial institution/ Social lender	• Financial institutions – typically social lenders – take a hands on approach to R&R that goes beyond merely providing capital. These actors rely heavily on local SHF orgs. to help implement programs	• Improved rural livelihoods • Commercial/concessional return on capital	Coffee Farmer Resilience Initiative (Root Capital)
Retailer/Roaster	• Retailers and roasters help to finance R&R activities in their own supply chains. They typically rely on others to help implement programs	• Quality and security of supply • Relationships with government/ license to operate • CSR/risk management	Starbucks One Tree for Every Bag Commitment Program
Trader	• Traders help finance R&R activities in their own supply chains. They can implement directly if they are closely linked with SHF	• Maintain niche and segment in their value chain (as part of securing supply)	ECOM – IFC – IDB – Starbucks facility
NGO/Foundation	• NGOs that engage in R&R/R&R-related projects for climate change, sustainability, and/or farmer livelihood purposes • Certification agencies that do similar projects as supply chain actors	• Improved livelihoods • Climate change mitigation (reduction in deforestation) • Climate change adaptation	Insetting and replanting programs (PUR project)
Public sector	• Public sector bodies distribute planting material, technical assistance, and provide grants or concessional loans to farmers to adopt R&R. May create government R&R service systems to integrate and deliver R&R package of inputs & finance to farmers	• Improved rural livelihoods • Increased taxes through increased coffee production • Votes/public support	Replanting program (Vietnam)
Estate (large farm)	• Estate operator takes over SHF plots and undertakes R&R, finances the R&R, and returns land to SHFs when R&R is complete. SHFs work as wage labor on land during 'valley of death' and pay back operator through increased production	• Profitability in operations • Quality and security of supply	Palm oil program Indonesia (Cargill)
Private service company driven (Supply chain actor)	• Development of farmer service company structures that deliver R&R services (amongst other services), and potentially provide farmer finance on the ground (sometimes co-developed by supply chain actors)	• Profitability in operations • Quality and security of supply	Cocoa Sustainability Program (Mars)

Non-coffee

Sources: Dalberg and IDH, *Smallholder tree crop renovation and rehabilitation (R&R): A Review of the State of the Emerging R&R Market and Opportunities to Scale Investment*, 2015 – note that the methodology from the IDH study has been slightly updated for this study; Dalberg interviews

Successful R&R programs further rely on a support system of different types of actors that each fill a specific role in R&R projects[1]

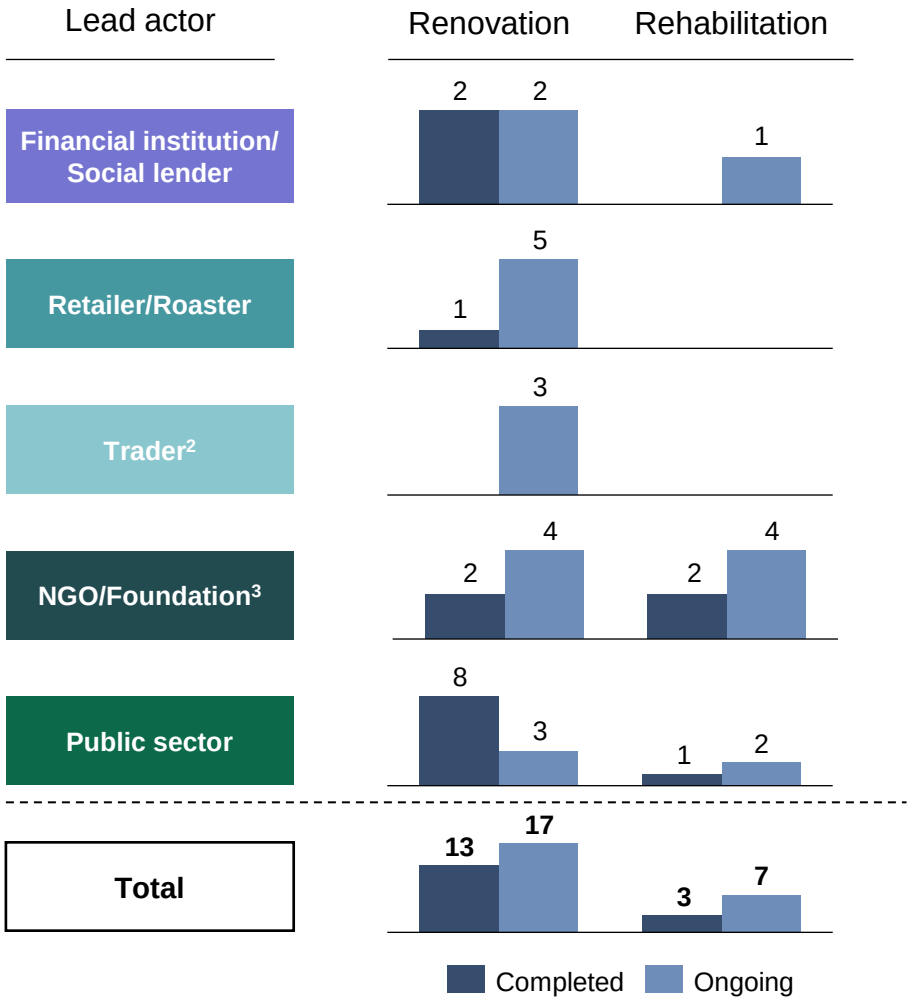
Type of actor	Supply chain actors	Financiers	Policy/public actor	R&D	SHF support and NGOs	Input provider
Examples	STARBUCKS, ECOM, Nestlé, KEURIG GREEN MOUNTAIN, COUNTER CULTURE COFFEE, SMUCKER'S THE J.M. SMUCKER COMPANY	OMIN, root capital, USAID FROM THE AMERICAN PEOPLE, Moringa, IFC, IDB Inter-American Development Bank, Banco Agrario de Colombia	SAGARPA, FIRA, Icafe Instituto del Café de Costa Rica, Republic of Kenya Ministry of Agriculture, Livestock and Fisheries	WORLD COFFEE RESEARCH, CIAT, WAGENINGEN UNIVERSITY & RESEARCH, TaCRI TANZANIA COFFEE RESEARCH INSTITUTE	TECHNOSERVE, Federación Nacional de Cafeteros de Colombia, ORGANIC ACOB COFFEE, CONSERVATION INTERNATIONAL	YARA, syngenta
Key roles and R&R activities	Engage in R&R activities within their own supply chain Help lead programs and often rely on local partners to implement programs Rally other actors to support R&R	Finance R&R activities, either through grants or loans Supply chain actors, NGOs, and public agencies can also play this role though it is not there primary role	Influence R&R outcomes (and coffee farming in general) via specific policies and national-led R&R programs Help implement R&R programs in some countries	Provide research into better agronomic practices, seed genetics, climate change, etc. Help verify practices and establish standards	Build capacity at farmer level Speak for farmers at national level and help improve conditions for SHFs (and coffee sector in general) Take long-term risks	Provide specific inputs to R&R programs such as planting material for replanting or fertilizer Take part in project coalitions, but rarely lead R&R programs

Notes: (1) Not all actors are present in all countries

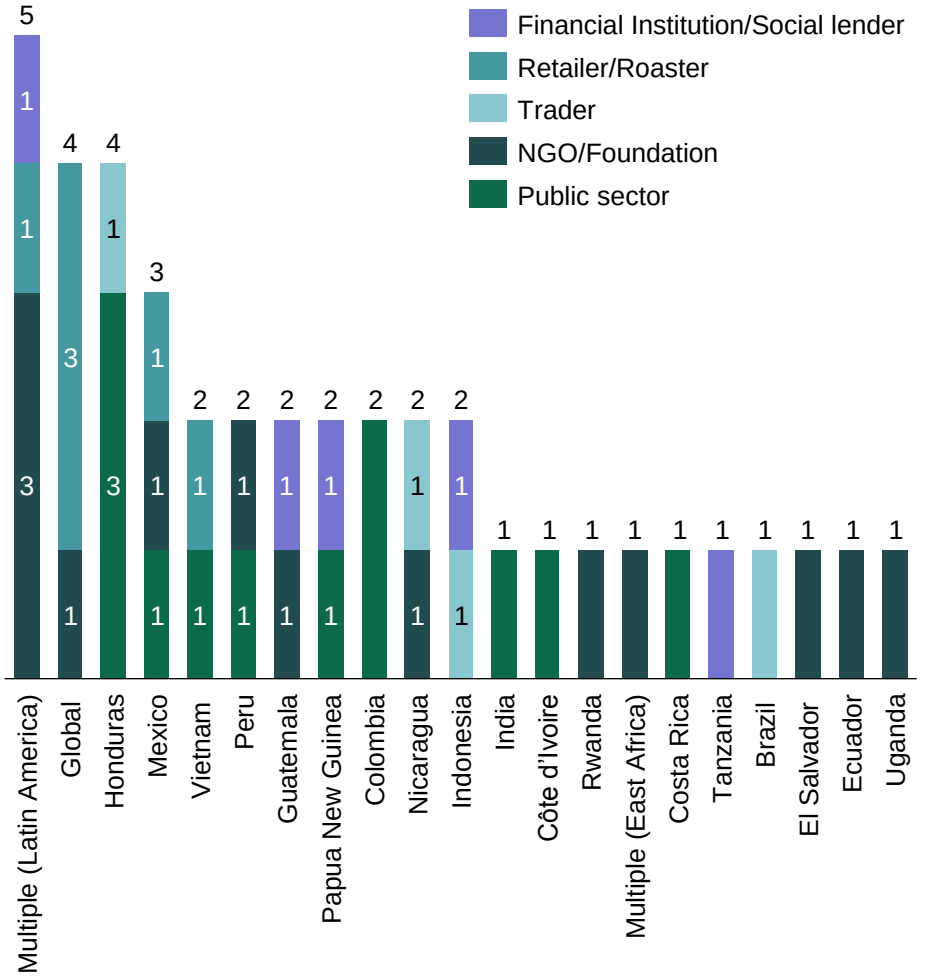
75% of the 40 studied R&R projects are renovation programs, most of which are still ongoing in Latin America, indicating that there are few results to evaluate[1]

NOT EXHAUSTIVE

Ongoing and completed R&R programs (by lead actor)
Number of programs



Geographical distribution of surveyed R&R programs
Number of programs



Notes: (1) A table detailing the 40 completed and ongoing R&R programs can be found in the Annex. (2) One program led by a distributor of agricultural inputs (Grupo Caldega) is included in this category. (3) This category also includes program led by research institutions and promoting an enabling environment for R&R (e.g. nursery verification programs) – It also include a capacity-building program in Uganda that prepares farmers for rehabilitation. Source: Dalberg analysis and interviews

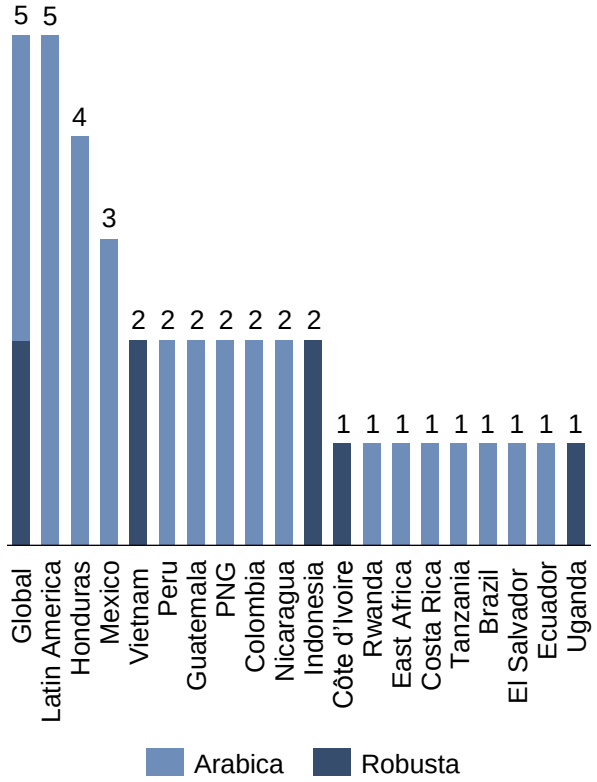
The changing Arabica-Robusta supply composition and past R&R program foci have important implications for future R&R efforts

80% of the R&R programs surveyed in this Guidebook have targeted countries or regions producing mostly Arabica…

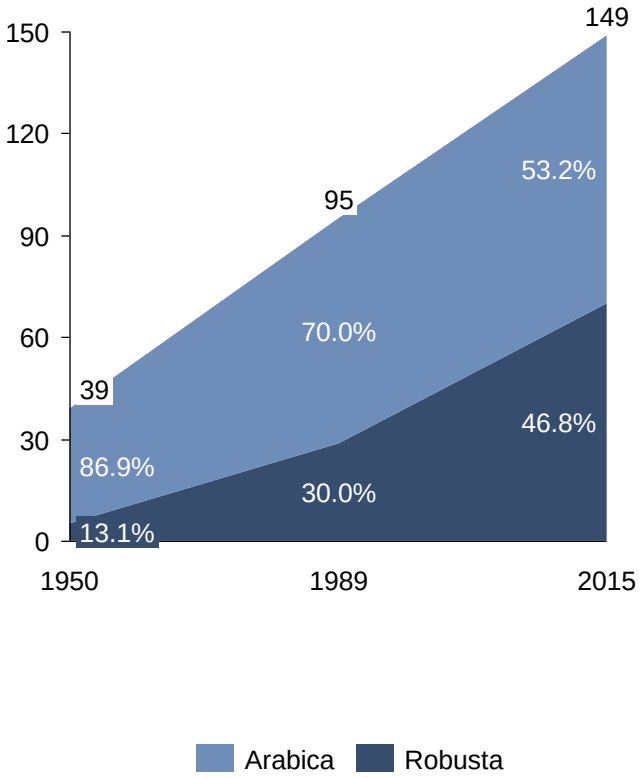
…however, Robusta has increased its share of the global production significantly over the past 30 years…

…which has important implications for R&R efforts globally

Distribution of surveyed R&R programs in Arabica and Robusta producing countries[1]
Number of programs



Arabica-Robusta global supply composition[2]
Millions of 60kg bags, percentages



- Given that Robusta is increasing its share of global supply, R&R efforts cannot neglect Robusta regions in the future
- And there are important questions for plant varietals R&D and R&R:
  - Is it possible to bring more Robusta traits over into Arabica through introgression (e.g. temperature tolerance, new pathways for La Roya resistance), etc.?
  - Is it possible to make Robusta taste better and therefore attract premium prices? (though Robusta demand is already growing in several regions of the world)
  - Are there specific barriers for R&R in Robusta? (e.g. slimmer margins, different practices?)

Notes: (1) We sorted countries as "Arabica producing countries" or "Robusta producing countries" based on the variety representing the main share of their production. (2) Data from HRNS, *Michael R Neumann Presentation at Milano Expo September 2015,* 2015. Source: Dalberg analysis and interviews

We estimate that around 600,000 farmers to date have been reached by R&R programs, representing around 3-7% of all farmers in need of R&R[1]

Click here for methodology (annex)[2]

Around 600,000 farmers have been reached by programs to date

Estimated number of farmers reached by past and current R&R programs

We estimate that around 11.5 million farmers are in need of R&R globally

Legend 100,000 farmers | Farmers reached by R&R programs | Farmers in need of R&R[2]

Note: (1) This estimate is based on 28 completed and on-going renovation and rehabilitation programs – we have included a range around our estimate to account for uncertainty. (2) The methodology includes an estimated breakdown of farmers between different farmer segments in the farmer pyramid referred to here. Source: Dalberg analysis

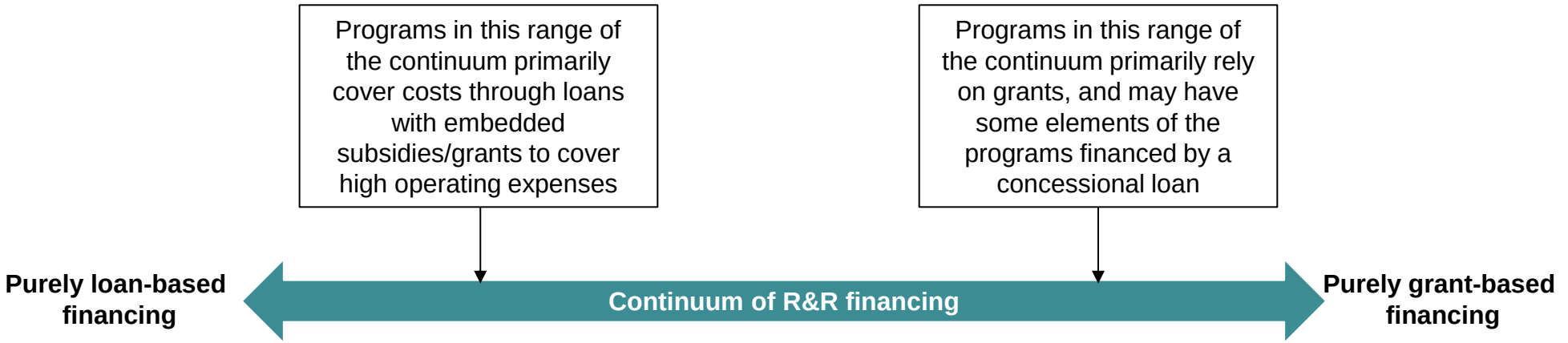
Past R&R programs have either been financed by grants alone or by concessional loans supported by grants or subsidies to cover high operating expenses[1]

Concessional loans: short-term return based

Loans providing below market rate returns to the lender. Concessional loans may offer interest rates priced below risk-adjusted market rates, principal write-downs, and/or generous grace periods to increase affordability for the borrower. Lenders generally rely on grant support for operating costs not covered by loan interest or fees. Concessional lenders still expect to be repaid.

Grants: long-term capacity building investments

A financial award with no expected repayment or compensation over a fixed period of time, but which seeks to be enabling and long-term capacity building for the recipient (and its environment).



Note on terminology: For all loan-based programs studies in this Guidebook, loans have been supported by some form of a grant, or other cost-reducing investment that decreases the risk of the loan. When we refer to "Loan-based" R&R programs, we therefore refer to programs where the primary financial instrument is a loan, which is supported by a grant

Notes: (1) Note that we have not seen examples of R&R programs that function on a risk-adjusted return basis (i.e. a full commercial basis) outside large and medium farms which do R&R as part of their standard operating procedures. Source: OECD, *Glossary of Statistical terms,* 2003; OECD; *Blended Finance,* 2017: Dalberg Interviews with Root Capital

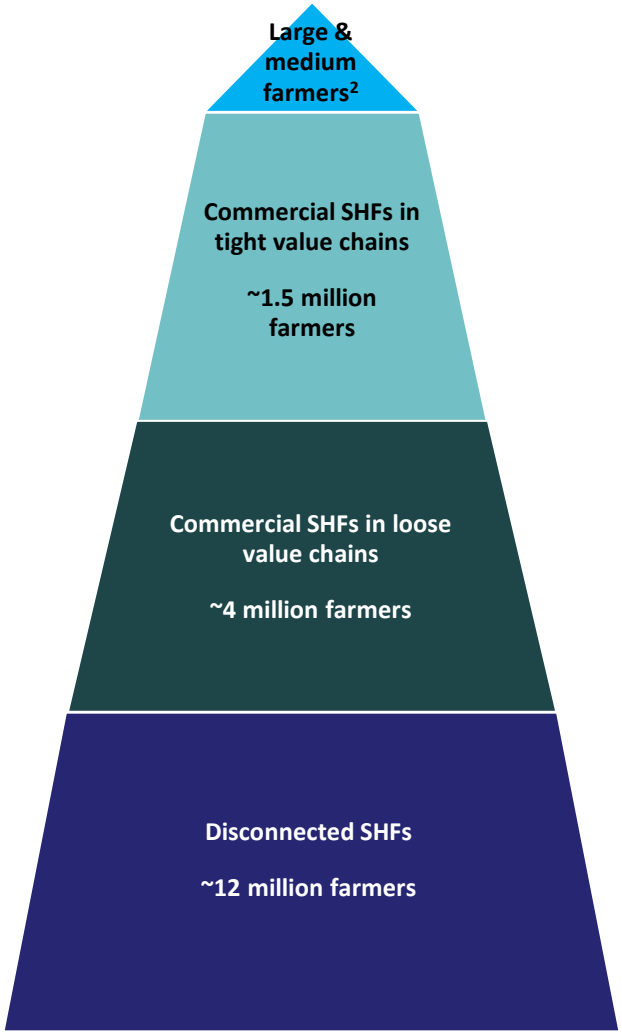
Seven types of actors provide finance to R&R, while sometimes also functioning as the lead actor of the R&R program

Finance provider	Potential Role(s) as an R&R investor	Specific investor example
Local finance institution	Typically able to finance smaller investments (through debt, typically at commercial rates unless other investors can insure or subsidize returns) if SHF is connected to coop or estate	Local banks in El Salvador have started to provide renovation loans in collaboration with CLUSA
Supply chain actor[1]	Can finance the smallholder directly via replanting; can act as a guarantor for local banks to make SHFs more credible; make use of both grants and loans	Nescafé Plan and the Nespresso AAA Sustainable Quality Program
Conservation finance[2]	Provides long-term concessional debt or capital to projects that generate cashflows and that support land, water and resource conservation	Moringa Cafetalera Nicafrance SA ("Nicafrance"), a Nicaraguan agroforestry company
Social lender / impact investor	Provides long-term concessional debt; may or may not have any collateral; typically (not always) provided through SHF orgs. that on-lend to end users	Root Capital Coffee Farmer Resilience Initiative
DFIs & Multi-/Bi-Lateral Development Institution	Can provide grants, finance with below market returns and/or with concessional terms, mechanisms or guarantees to de-risk investments and attract other investors	USAID shared loss fund against coffee rust in Latin America; IFC and Inter-American Development Bank investment into ECOM coffee R&R program
Public sector	Provide public funding in terms of grants, subsidies or income support during 'valley of death'	Vietnamese government funds coffee replanting and extension services
NGO/Foundation	Provide grants as well as financing of specific parts of the R&R 'package' – e.g. capacity building in local community	HRNS Building Coffee Farmers Alliances in Uganda

Notes: (1) Supply chain actors are listed as commercially focused here because of their profit motive, but it is important to note that supply chain actors can also take on a significant social focus through philanthropic programs (e.g. the Starbucks One Tree for Every Bag Commitment Program). (2) Conservation finance is defined as the sum of all the "investment mechanisms that activate one or more cash flows generated by the sustainable management of an ecosystem, which in part remain with the ecosystem to enable its conservation, and which in part are returned to investors." McKinsey and Credit Suisse, *Taking Conservation Finance to scale,* 2016. Source: Dalberg and IDH, *Smallholder tree crop renovation and rehabilitation (R&R): A Review of the State of the Emerging R&R Market and Opportunities to Scale Investment*, 2015 – note that the methodology from the IDH study has been slightly updated for this study, and the methodology now only include coffee sector programs; Dalberg interviews

Concessional loan R&R programs are better suited to the top of the farmer 'pyramid', while grants are better suited to the bottom and middle

Coffee farmer pyramid[1]



Key characteristics	Credit risks	Transaction costs
Professionally run farms, with direct, short and stable links to rest of value chain. Adhere to GAP	**Lower credit risk**	**Lower transaction costs**
SHFs with close link to rest of value chain – either through traders, outgrower schemes, or SHF orgs. Make use of some GAP. Farm income relies heavily on coffee production.	Farmers further down the pyramid will tend to have lower financial literacy, less collateral, and there will be fewer ways to accurately understand credit risk (e.g. track record of selling to trader), or to mitigate credit risk (e.g. diversification through a cooperative).	Further down the pyramid, transaction costs will be higher as ticket size will tend to be smaller, access to the farmer will be more expensive (e.g. not aggregated through a coop), and due diligence/risk mitigation is harder (see left). As such, grants may be more suitable than loans.
SHFs which are less integrated into rest of value chain, often through poorly performing SHF. orgs. Typically do not adhere to GAP. Farm income only partly relies on coffee production.		
SHFs with no or weak/erratic links to rest of value chain, often selling coffee at the spot market in competition with many other farmers. Rarely adhere to GAP. SHFs often earn substantial income from other crops/non-farm activities.	**Higher credit risk**	**Higher transaction costs**

Notes: (1) Estimates of number of SHFs in each segment comes from Hans R. Neumann Stiftung, *Structure of the coffee sector and implications for R&R*, 2017, methodology from: Dalberg, *Inflection point: Unlocking growth in the era of farmer finance,* 2016; (2) These farms are generally not considered for this Guidebook as they are, at least partly, able to self-finance R&R. Source: Dalberg analysis and Dalberg interviews

Loans have been used for the upper part of the pyramid by the more commercially focused finance providers, whereas grants have been used across farmer segments[1]

Supply chain actors have targeted all levels of the pyramid so far, potentially seeing different visions of success for each group (see slide)

DFIs have used loans and grants, but are focused on developing financing products and wider programs starting at the top of the pyramid

Commercial focus → *Social focus*

	Local Finance institutions		Supply chain actors		Conservation Finance		Social lender / impact investor		DFI & Multi-/Bi-Lateral Development Institutions		Public sector		NGOs/ Foundation	
	Loan	Grant	Loan	Grant	Loan	Grant	Loan	Grant	Loan	Grant	Loan	Grant	Loan	Grant
Large and medium farmers	✓	✓	✓						✓	✓		✓		
SHFs in tight value chains	✓	✓	✓	✓	✓		✓		✓	✓		✓		✓
SHFs in loose value chains	✓	✓	✓	✓					✓	✓		✓		✓
Disconnected SHFs		✓		✓						✓		✓		✓

Public sector actors have used grants to target all levels. Selecting farmers on relative need may not be possible for a public sector actor (e.g. national government) or relevant for their definition of success (see slide)

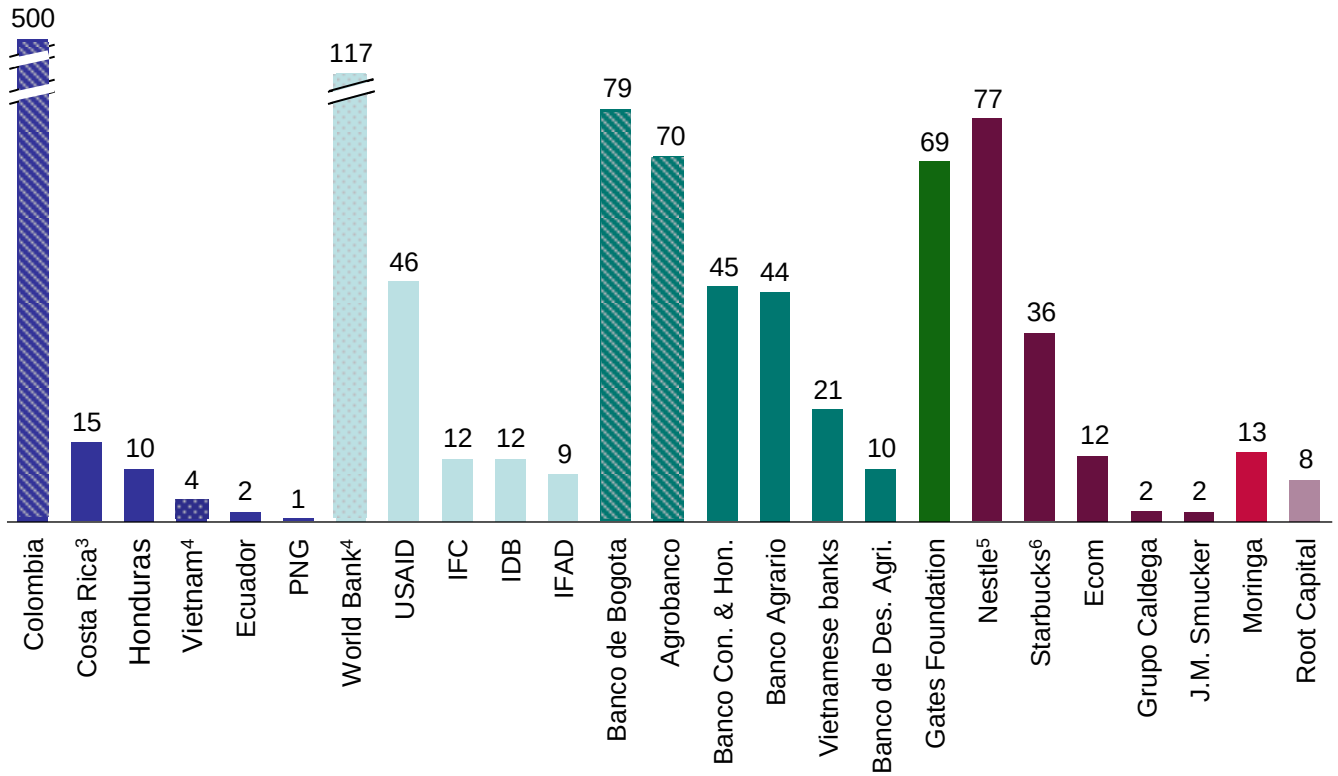
NGOs do not normally distribute loans, but have used grant funding tools to meet farmers' needs at all levels

Note: (1) The database of all the project listed above is available in the annex.

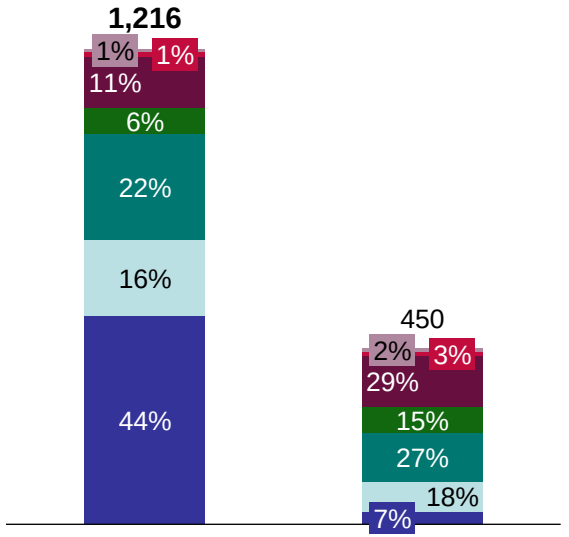
Public sector programs, local FIs, DFIs and supply chain actors have contributed more than 90% of the estimated USD 1.2 billion invested in R&R to date

Investments channeled by finance providers[1]
USD millions

NOT EXHAUSTIVE



Contribution to total R&R funding, including and excluding the Colombian renovation project[2]
USD millions, percentages



Investments in the Colombian public renovation program (PSF)
Investments in the Vietnamese public renovation program
Social lender / Conservation finance
Conservation finance
Supply Chain
NGO/Foundations
Local FI
DFI
Public sector

Notes: (1) Many of these programs include financing for broader productivity improving measures, and it was not possible to isolate R&R specific funding in all programs. Investments by actors in several programs are aggregated into one bar. (2) This breakdown only relates to 20 out of the total 40 programs in the project database, and is therefore a high-level estimate only - please see annex for a full overview of projects. (3) The investment in Costa Rica is provided by a consortium of public actors, grouped into a *Fidescomio.* The planned original funding was USD 81 million. (4) The World Bank, the Vietnamese government, and Vietnamese local banks funded the Sustainable Agriculture Transformation Project (VnSat). The project includes a coffee renovation component which we attribute to make up 1/3 of the total project budget. (5) Estimate is based on the financial commitment of the Nescafe Plan and the Nespresso AAA program between 2010 to 2020. Estimate assumes that funds were disbursed on a linear basis between 2010 and 2016, and that 25% of total funds was dedicated to R&R related activities. (6) USD 4 million of Starbucks' commitment overlaps with Root Capital. Starbucks' total commitment under the Global Farmer Fund is USD 50 million, this includes agronomy, restoration and infrastructure. Sources: Dalberg analysis

Contents

Overview of Section 3: How to make R&R work

What is covered in the section?

- The objective of Section 3 is to analyze and outline ***how to design and implement R&R programs on the ground***, taking a top down perspective
- Section 3 is **the main " how to guide" of the Guidebook** – as it includes decision making analysis tools for R&R implementers
- **Section 3.1 analyzes what the most ideal type of R&R program is,** given a particular context and need – to do so, the Section discusses key three themes: coffee viability, farmer segmentation, and R&R need
- **Section 3.2 focuses on the three R&R project components** and addresses previously encountered challenges in tailoring these components to farmers' needs

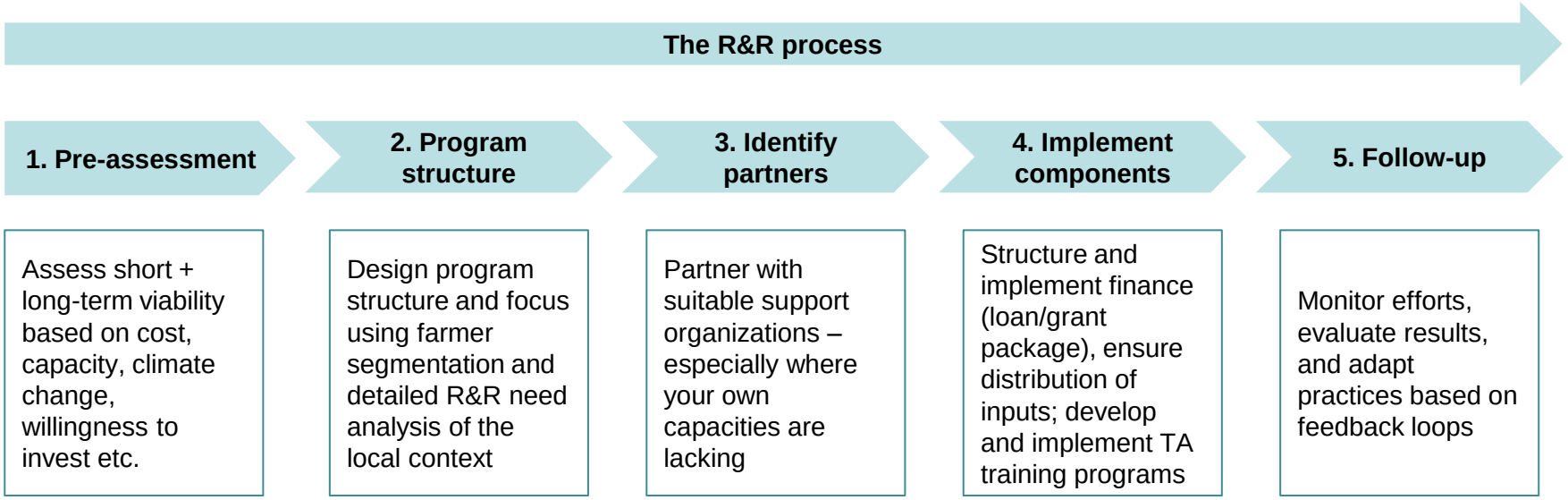
Key concepts

- **Coffee viability:** Is coffee, now and in the future, economically viable for SHFs?
- **Farmer segmentation:** Indicates how well connected farmers are to global value chains
- **R&R need:** Do farmers need renovation, rehabilitation, or "do nothing"
- **Climate suitability:** How suitable is a given area expected to be for coffee production the future given increasing temperatures
- **R&R decision tree:** A summary tool for decision makers to identify the most relevant R&R program type
- **Inputs:** Includes planting material, nutrition, tools, finance
- **Finance:** loans and/or grants to cover the cost (and lost income) of R&R
- **Agricultural risks:** Risks directly related to agriculture (e.g. production risks, price risks, enabling environment risks)
- **Lender risks:** Risks directly related to financers (e.g. credit risks, operational risks)
- **Loan tenor:** The length of time until a loan is due (in this section, from when loan is given)
- **Grace period:** A period during (usually the beginning) of the loan tenor where repayment requirements are waived

Overview of Section 3: How to make R&R work

What are the main takeaways?

- There are five central steps to a successful R&R process:



- **Step 1 and 2 are determined via the R&R decision tree** which helps stakeholders identify the viability of coffee, the different farmer segments, farmer bankability and capacity to conduct R&R, as well as the detailed R&R need in a particular group of farmers
- **Step 3 will vary depending on the lead actor's network and specific geographical context**
- **Step 4 requires a detailed tailoring and implementation of the three project components (inputs, finance, knowledge)**
- **Step 5 is essential for future learning and adaptation to changing circumstances**

Contents

Decision makers must answer three types of questions to determine whether R&R is needed in a given context

What is the right, if any, R&R program in a given context?[1]

1. Coffee viability	2. Farmer segmentation	3. R&R need
Is coffee – now or in the future – economically viable for SHFs? What needs to be in place for SHFs to be willing to invest in R&R?	Which type of value chain do SHFs belong to? How 'serviceable' are they by value chain/sector actors?	What is the condition of trees and are SHFs already making use of GAP?

INSIGHT

R&R program analysis does not start with determining the R&R need – rather it first starts with a broader analysis of the viability of coffee and the farmers' willingness to invest in R&R, then an analysis of the farmer segments of the relevant context; R&R need determination comes *after* these two analyses

Note: The three questions types can be considered at different geographical levels: agroecological zones, country level, state/region level, farmer level. For example coffee viability both relates to agroecological zones (e.g. climate change impact), country level (e.g. supporting R&R policies) and state level (ecosystem of supporting actors); Farmer segmentation both relates to country level (e.g. what regulations support a certain value chain structure) and state level factors (e.g. what are the local lending institutions?)

Notes: (1) This is a top-down decision tool targeted at retailers, roasters and other supply chain actors. This is different from bottom-up approaches that attempt to incorporate R&R approaches in SHFs' farming practices. Source: Dalberg analysis

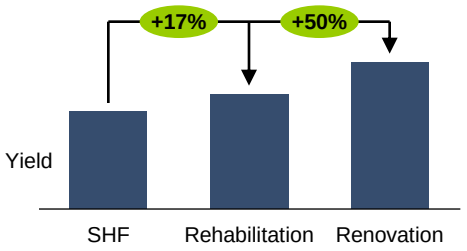
There are both short- and long-term factors that determine SHF coffee viability

Short-term viability

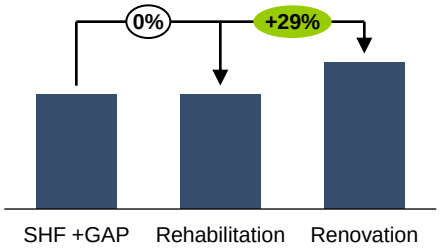
Profitability: Are SHFs able to cover their variable costs such as labour, inputs and materials in a given year?[1] Are SHFs able to cover the farm operating costs – such as annual payments for cooperative memberships, taxes and loan repayments, as well as tools and equipment - in the short-to-medium-term?[2]

Yield uplift potential: What is the uplift potential? If farmers are already performing relatively well, or if the promised uplift from R&R is not that much higher than current yields, R&R might not make financial sense/be too risky to undertake.

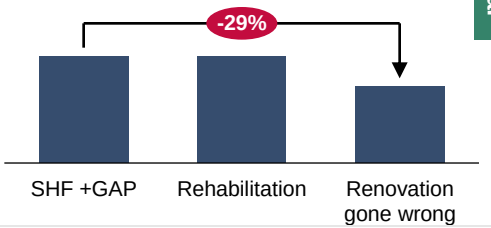
Scenario 1
A SHF with poor current yields and practices stand to achieve significant uplifts from both rehabilitation and renovation



Scenario 2
However, if SHFs are already making use of GAP, the potential uplift from R&R is likely a lot smaller and possibly not worthy of a risky investment



Scenario 3
And well performing SHFs could even lose out via R&R if there is implementation failure (e.g. seedlings are attacked by pests), stressing that yield uplift rests on successful implementation



Conceptual

Economic uplift potential: What does the SHF stand to gain from replanting with higher priced, speciality varieties (even if yield is the same/lower than current yields)? Conversely, what does the SHF stand to lose by replanting a non-demanded variety?

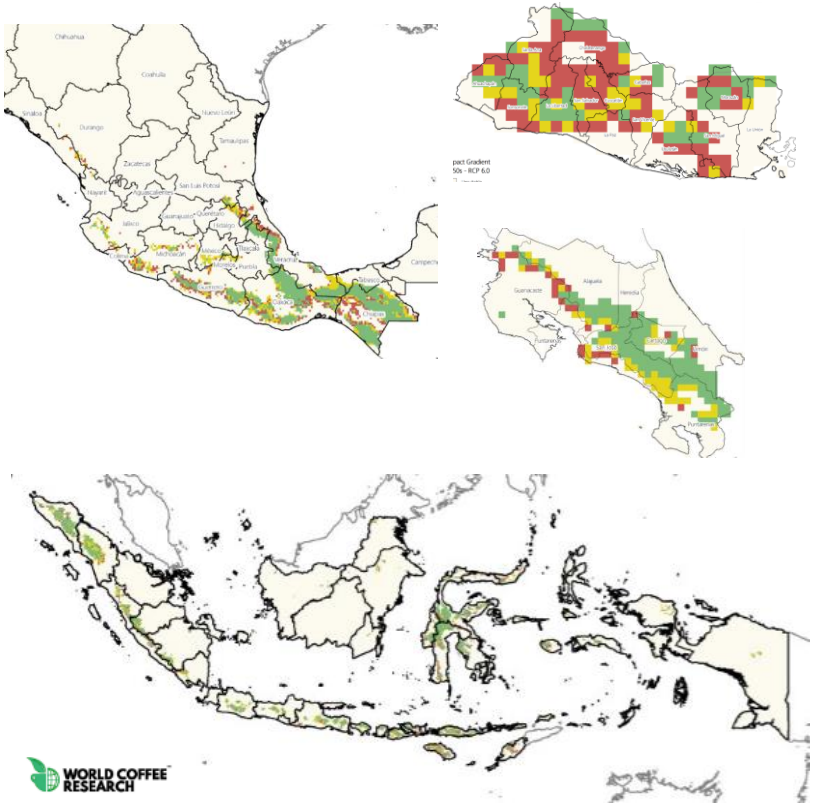
Long-term viability

Opportunity costs: How well does coffee production fare compared to alternatives? Are SHFs likely to abandon coffee production, or pursue alternatives, given (perceived) future income levels?[3] Unless SHFs can cover their long-term costs, they might not be able to invest in R&R, and other crops/activities might be more profitable compared to coffee.

Notes: (1) If a farmer's revenue is below his or her variable costs, then coffee is considered to be uneconomical to produce. (2) These are a farm's operating costs, and thus a producer must also cover these costs in order to stay in business in the short/medium-term – note that both variable and farm operating costs can be characterized as farm OPEX, but that the distinction helps to highlight whether investments are not viable (if farmers cannot cover their variable costs), or if they could be viable (if farmers can cover their variable costs, but not currently their farm operating costs) – Note that the Global Coffee Monitoring program will produce data on farm profitability in the future;(3) Competitive job opportunities outside of coffee do not necessarily mean that coffee will be abandoned. As long as farmers lack the education/qualification to access skilled labor / well paid jobs, coffee will likely have a role as extra income, though it may play a declining part in the SHFs' priorities.
Source: IDH and Rabobank, *Rehabilitation & Renovation of crop trees in cocoa, coffee, palm oil,* 2015; Fair Trade USA and Cornell University, *Cost of Sustainable Production*, 2017; Dalberg interviews

Climate change is a particularly important long-term viability factor, and is central to analyze before making replanting decisions

Examples of CIAT and WCR climate suitability maps for Arabica coffee



Climate suitability maps are an important tool in determining coffee viability

CIAT and WCR has developed climate suitability maps that show the impact of climate change on coffee growing areas[1]

The maps should be interpreted in their global context. I.e. impacts can be compared between countries and regions, but should not be interpreted down to plot level.

The maps are also limited to Arabica and do not consider Robusta species.

The impact gradient is based on an intermediate business as usual greenhouse gas emissions scenario with a warming well above the Paris goals.

The maps differentiate four degrees of climate change:

- **Unsuitable sites**: Most likely cannot be used for production
- **Transformation sites**: Alternative tree crops like cocoa or Robusta coffee may be easier to adapt than Arabica at these sites.
- **Systemic change sites**: Adaptation to climate change will likely require changes of the production systems, e.g. by using adapted varieties, intercropping etc.
- **Incremental change sites**: Adaptation to climate change will likely be possible using incremental changes to the production system, e.g. added shade or improved pest and disease management by use of resistant varieties.

Climate change and the financing of renovation: Moringa, an agroforestry impact investment fund, invested USD 13.3 million into NicaFrance to transform 1,700 hectares of degraded land into an agroforestry-based coffee plantation. Moringa partnered with coffee research institutions such as the French agricultural research and international cooperation organization (CIRAD) to design this program.

Notes: (1) The suitability maps were developed together with World Coffee Research to provide a global assessment of climate change related risk in potential Arabica production areas. The method was a comparison of the distribution of climate zones in which Arabica is currently produced and their distribution under future climate scenarios. This means that we considered the adaptive range currently available globally, but not a possible expansion of this range by novel technologies or technology transfer from other countries. Adoption of adaptive agricultural practices (e.g. novel varieties, irrigation, or shading) may result in alternative developments of the distribution of coffee in the future. Equally, climate was defined as a multi-decadal average of weather conditions. For many farmers two consecutive years with low harvests may be more decisive even if the decadal average harvest is sufficient. Source: CIAT and World Coffee Research, *Climate Suitability Maps,* 2017 – for more information, please contact Christian Bunn, c.bunn@cgiar.org; Dalberg interviews

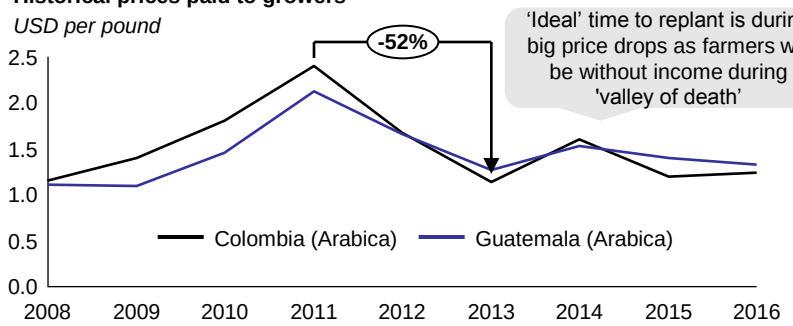
Viability factors influence farmer willingness to invest in R&R – both in the short- and long-run

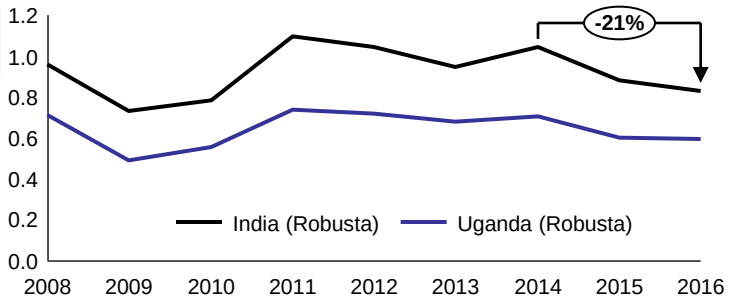
Short-run willingness

- **Short-term outlook:** Are SHFs willing to increase production costs for potential increased profits? As previously stated, some SHFs might be able to increase their profitability by reducing inputs and production costs rather than increasing them. SHFs that only marginally rely on coffee as their income might prefer not to invest in R&R.
- **Behavioural economics/timing questions:** When prices are low farmers find it harder to afford investing in R&R, and when they are high they might not want to 'lose out' – and prices are hard to predict…

Historical prices paid to growers[1]

USD per pound





- **(Failure to ignore) sunk costs:** SHFs may be emotionally and financially attached to old (inherited) trees in which they have invested significant time and resources. SHF willingness to invest does not solely depend on the economic case for R&R

Long-run willingness

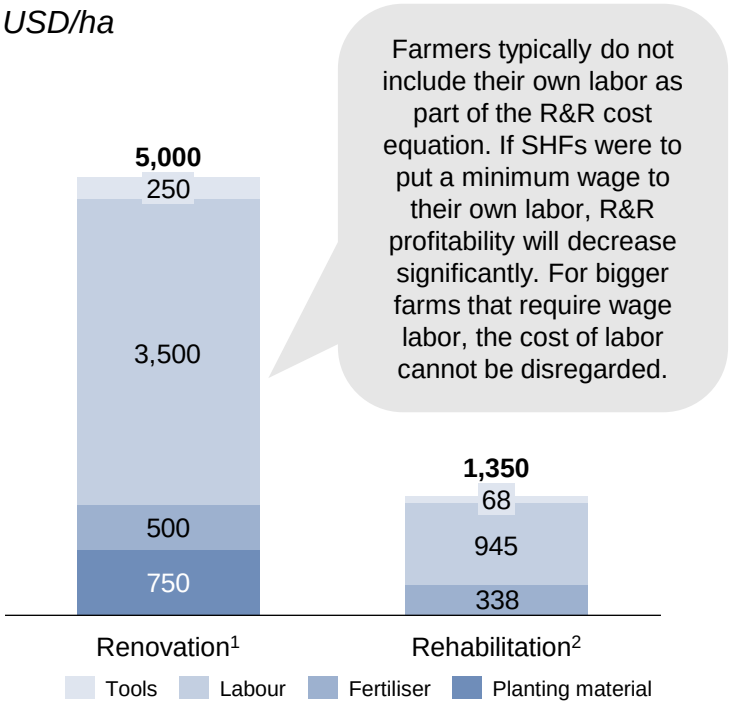
- **(Perceived) long-term outlook:** Do SHFs have a positive or negative outlook on the viability of coffee production? Do SHFs have stable offtake agreements that make the future more certain and who are they selling their coffee to? Since R&R (especially renovation) is a long-term investment that can only be paid back over five plus years, SHFs need a long-term positive outlook on coffee to be willing to invest – or at least the outlook needs to be preferable to alternatives.
- **Structural change:** Is an old SHF less willing to invest in R&R if her/his children are not taking over the farm? Structural change might mean that older farmers are unwilling to invest more time and effort in their coffee fields because their children have moved to the city and are unlikely to come back and cultivate the land.

Source: (1) ICO, *Prices Paid to Growers,* 2017; IDH and Rabobank, *Rehabilitation & Renovation of crop trees in cocoa, coffee, palm oil,* 2015; Dalberg interviews

R&R profitability should always be analyzed locally given the widely varying cost estimates of R&R programs…

Exampled of cost breakdowns of renovation and rehabilitation

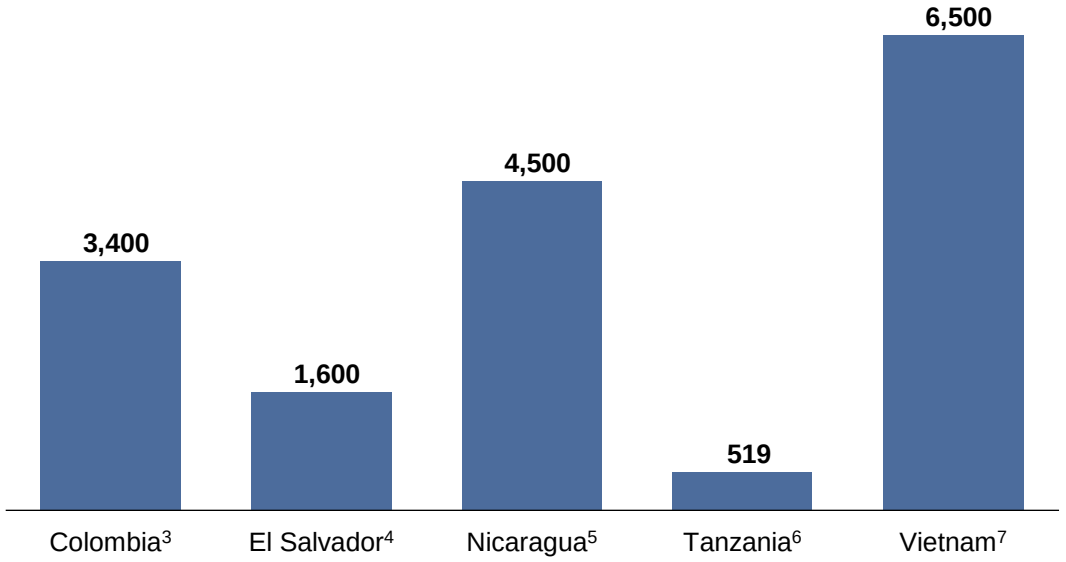
USD/ha



Farmers typically do not include their own labor as part of the R&R cost equation. If SHFs were to put a minimum wage to their own labor, R&R profitability will decrease significantly. For bigger farms that require wage labor, the cost of labor cannot be disregarded.

Cost comparisons of renovation programs

Multiple countries, USD/ha, multiple years



Detailed data exists in some cases…

…but it is hard to take an "industry view"
Cost divergence reflects accounting, R&R model, and country differences

World Coffee Research (WCR) is leading the **Global Coffee Monitoring Program** to create more consistent data on R&R. WCR implements new varieties and soil treatments on demonstration plots and compares performances against a control plot. More data will help to make the case for R&R and to increase access to finance. Read more.

Notes: (1) The breakdown is calculated on the basis of numbers in Root Capital, *Financing Farm Renovation: How to Build Resilience Using a Blend of Capital,* 2016 – we use the conservative estimate of USD 5,000 per hectare rather than the low estimate of USD 3,000 per hectare - Numbers are calculated on the basis of Root Capital's work in Latin America. (2) Rabo International Advisories Services, *Rehabilitation and Renovation of crop trees in cocoa, coffee, palm oil,* 2015 – note that the breakdown of rehabilitation is based on interview estimates, whereas total hectare cost is from the Rabobank report; (3) Rabo International Advisories Services, *Rehabilitation and Renovation of crop trees in cocoa, coffee, palm oil,* 2015 ; (4) Estimate from UCLA, El Salvador; (5); Interview with ECOM, 2017 (6) Tanzania numbers are government subsidized; (7) Aidenvironment, NewForesight and IIED, *Case study report Coffee in Vietnam,* 2015: The Vietnam estimate is high since the estimate refers to a longer process and includes the cost of loans, fertilizer systems etc.

…and it should take into account alternative family income factors since coffee is often not viable as a sole source of SHF income

Smaller coffee farmers can rarely rely on income from coffee alone…

Given the general deprivation of many SHFs, coffee is unlikely to be economically viable if it is viewed in isolation. Many SHFs do not have enough land, nor an opportunity to expand their land, to produce sufficient income:

> *"For instance in Colombia the average farm size is around 1.8 ha and is only able to provide 40% of a family's income. Hence suggesting that the farms needs to scale to around 5 ha to be able to generate a full family income."* – Rabo International Advisories*, 2015*

…though family incomes can be viable if other economic activities are taken into account

When costing R&R and analyzing economic viability, implementers must therefore take the full family income, (coffee income and non-coffee income) into account:

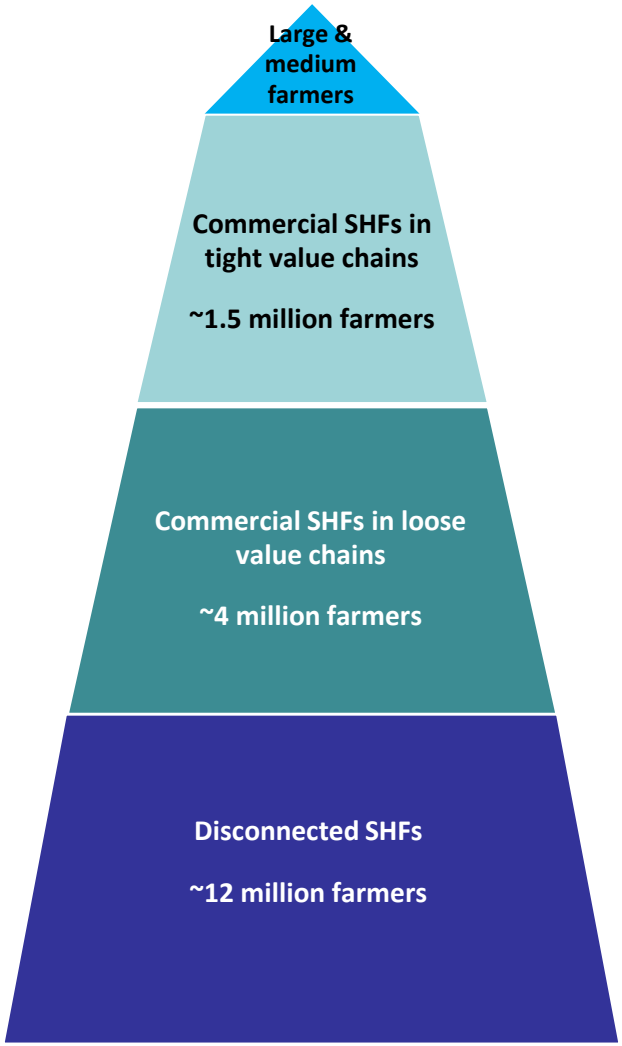
> *"A small farm can be viable if, for example, the owner works most of the year in the nearby city. We have such cases in one of the most important producing regions of Guatemala (Santa Rosa) where very small farms are doing OK because the husband works most of the year in the city and the wife manages the farm. Coffee in these regions is the single most important source of income, although no one would survive only on the farm income." – HRNS*

Implication for R&R implementers:
When analyzing coffee viability in relation to R&R, implementers should note whether there are opportunities to decrease the impact of the 'valley of death', by having family members earn income from other activities

Source: Rabo International Advisories Services, *Rehabilitation and Renovation of crop trees in cocoa, coffee, palm oil,* 2015; Email correspondence with HRNS, September 2017

Different types of SHFs typically require different types of R&R and are easier/harder to serve

Coffee farmer pyramid

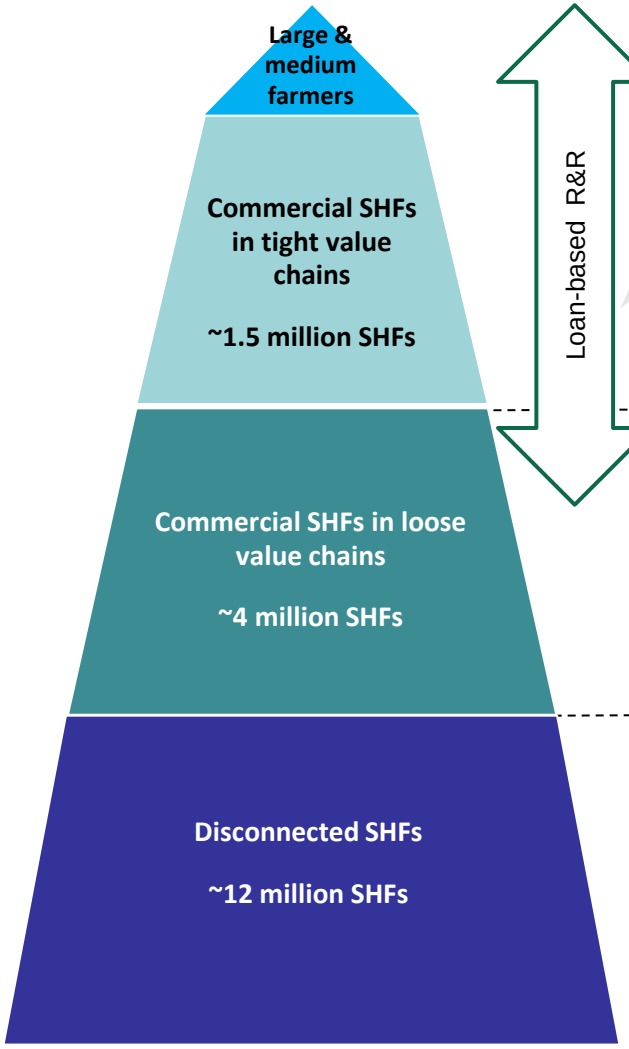


Access to finance & inputs	Typical R&R need	R&R transaction costs
• Access to finance (either self-finance as part of ongoing operations or loans) and inputs	• Conduct R&R as part of ongoing operations – have low need • Low yield uplift potential	• Low/medium
• Informal and formal access to finance, some technology, inputs and knowledge	• Higher yields with some potential for R&R uplift • Need to fill specific TA gaps • Need to fill TA gaps for value chain actors	• Low/high: R&R on a loan basis with some grant-based investments (such as TA)
• Some/limited access to finance, inputs, and information	• Low yields with big potential for R&R • Need for TA • Need for investment in 'missing' market elements	• High: R&R on a grant basis, sometimes with concessional loans possible
• Limited access to finance and other inputs – weak and inconsistent links to market, finance, input and technical assistance	• Lowest yields with big potential for R&R uplift • Need for investment in industry structures before "being ready" for R&R	• High: R&R on a grant basis only, and with long-term investment horizons

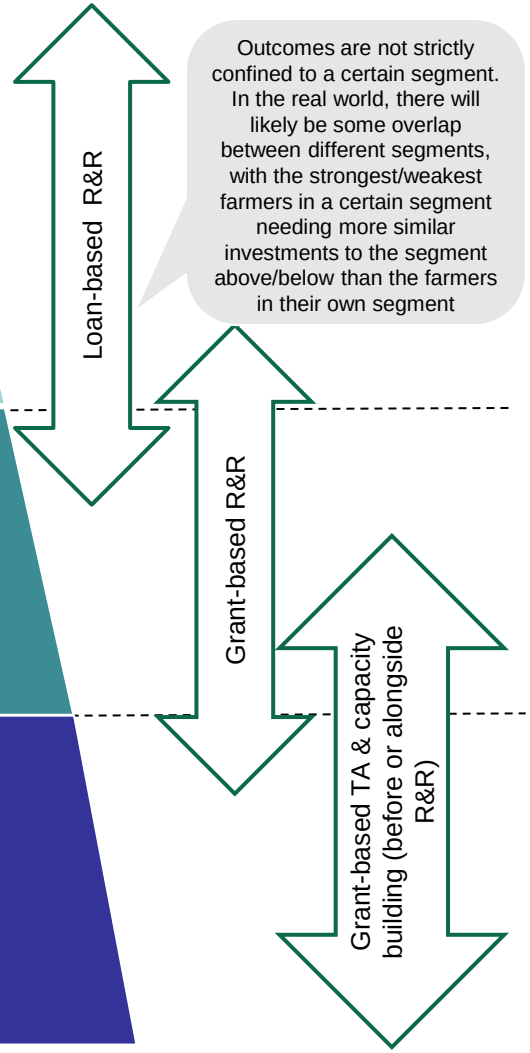
Source: Hans R. Neumann Stiftung, *Structure of the coffee sector and implications for R&R*, 2017 – this source references the indiciated number of farmers at each level of the pyramid; Dalberg, *Inflection point: Unlocking growth in the era of farmer finance,* 2016 – this source references the labelling of the different pyramid segments, including their key characteristics; Dalberg interviews and analysis

Farmer segmentation is therefore an important tool to help determine the most likely financing instrument and capacity to undertake R&R at the farmer level

Coffee farmer pyramid



Farmer bankability[1]



Outcomes are not strictly confined to a certain segment. In the real world, there will likely be some overlap between different segments, with the strongest/weakest farmers in a certain segment needing more similar investments to the segment above/below than the farmers in their own segment

Capacity to undertake R&R

These are the strongest, most well connected farmers, and therefore also the farmers that are most likely to be suitable for loan-based R&R programs

Even at this level, loans will likely have to be concessional and coupled with some technical assistance (likely financed via grants) and for the 'weakest' farmers in this segment, it might still not be feasible to do loan-based R&R programs (e.g. if the enabling environment is lacking key features)

These farmers are less strong, but still with some connection to global value chains and therefore suitable for more grant-based R&R programs

For the strongest of these farmers there may be opportunities to pilot loan-based financing with highly flexible and tailored repayment schedules and a heavy focus on technical assistance (financed via grants). Conversely, the weakest farmers might require systemic capacity building (e.g. through investments in coops) before, or alongside, investments in more complex R&R programs.

These farmers are weakly connected to global value chains and therefore require systemic capacity building (e.g. through investments in coops) before, or alongside, investments in more complex R&R programs.

Farmers are unlikely to be able to repay loans and R&R programs must therefore be fully financed via grants.

Notes: (1) We explore the concept of farmer bankability in this section more thoroughly. Source: Dalberg analysis

Even within communities, farmers have different characteristics and profiles that partly steer their engagement in R&R

Farmer 'personas'[1]	Key characteristics	Potential implications for R&R engagement	Implications for R&R implementers
"The industrious famer"	• Successful through own initiatives and acquired skills • Recognized by the community for accomplishments, and willing to share knowledge • Knows what is needed to succeed with new crops, and is always willing to experiment	• Willingness to invest is high and farmer could function as a 'pilot' farm for R&R that could help bring others on board	• Even at local scale, small groups of farmers will have different priorities and such benefit from different R&R product options • To reach significant uptake, solutions must be flexible and cater to individual farmer needs (e.g. by having flexible repayment schedules, and different loans products) • Program implementers should target the most industrious and community-active SHFs to take part in training and onboarding of less experienced farmers • Some farmers are unlikely to invest before they have seen good results at their neighbors
"The community activator"	• Charisma and ability to engage people within community • A lot of energy goes to voluntarily manage a savings group • Although not necessarily a farming expert, she is well known for making strong decisions	• Can help capacity build and advocate in coops and local institutions • Will need some training on R&R	
"The restrained entrepreneur"	• Feels comfortable taking significant financial risks to improve income, but has few opportunities • Has tried to diversify income in creative ways, but struggles to make profit due to lack of access to capital	• Willingness to invest is high but will require financial support • Needs to be informed about the trade offs of R versus R	
"The rising contributor"	• Committed to contributing to the future and prosperity of his community and is first in line when collective initiative emerges • His situation is fairly stable and plans for the future look promising if there is available support. Knows what support is needed since he has taken risks for growth in the past	• Willingness to invest is high, though will need training on R&R and implications of long-term loans • Could function as trainer for other farmers	
"The burdened breadwinner"	• Barely manages to cover expenses for the year and has to come up with new ways to make sure cash is flowing, so works in part-time jobs • One investment gone wrong has set him/her back and he/she now struggles to pay debt and get households finances in place • Knows how to improve the farm, but often has to cover unexpected expenses and emergencies, making long-term planning difficult	• Willingness/capacity to invest is low given low capacity	

Notes: (1) All personas and their characteristics are from: CGAP and Dalberg Design Impact Group, *Applied Product Innovation for Smallholder Households in Rwanda Using Human-Centered Design,* 2015 – based on in-person interviews and group sessions with smallholder farmers in Rwanda.

It is also important to understand the strength of national and local support systems for R&R[1]

R&R support system	Financiers	Policy/public actor	R&D	SHF support and NGOs	Input provider
Characteristics of a strong support system	**Local financial institutions:** By offering finance to farmers or SHF organizations, local FIs help improve the general enabling environment for SHF agriculture	**Government support:** In countries like Vietnam and Colombia, the government has been the lead actor in running national level renovation programs – while this is unlikely to be viable in most countries, lesser levels of government support helps to strengthen the enabling environment (e.g. through subsidies for R&R)	**A strong focus on R&D:** National-based R&D programs have all helped countries badly stricken by *La Roya* to recuperate by increasing the general knowledge level on plant varieties and GAP in the country	**Transparent and strong farmer organizations:** Strong SHF organizations can contribute to an effective enabling environment for the individual farmer by supporting the farmer accessing inputs, finance etc.	**Well functioning nurseries:** Most countries lack certified nurseries that can provide high quality planting material. Input providers can also help support R&R programs by increasing access to nutrients and other inputs

See Section 5 case studies for more examples of how enabling environments have supported R&R

Notes: (1) We have removed supply chain actors from this specific slide, since they typically operate internationally

Decision makers must then understand whether R&R is needed, and which option is most appropriate

What is the underlying **need for R&R?**

R&R need analysis should start with understanding the agronomic 'fundamentals':

- Before jumping to a hasty renovation/rehabilitation decision, farmers must understand the agronomic fundamentals, including:
  - Soil analysis to understand nutrition and other specific needs
  - Root and stem analysis of trees to understand their condition
  - What variety is already planted and how well is that intrinsically suited to future needs (e.g. climate change)

Secondly, need for R&R is driven by:

- Age of trees: trees younger than 20 years typically do not need to be replanted
- Disease: if trees are badly affected by diseases or pests it might be necessary to replant them
- Current agricultural practices: are SHFs already rejuvenating their plants and making use of good agricultural practices?
- Climate change: Increasing farmers' adaptive capacity in light of changing climate conditions

What is the preferred **R versus R** option?

Rehabilitation should be the first choice in most contexts given:

- The smaller and shorter financing need (and associated investment horizon)
- The smaller risk of implementation failure
- The benefits of old trees (bigger and stronger roots that are more drought resistant than young trees)
  - For example, if trees are merely old but in otherwise good condition, it may be most appropriate to rehabilitate them

But some situations require renovation:

- Trees may be irreversibly affected by diseases to the point where renovation is only remaining option
- Superior yields and income associated with new varieties may warrant the renovation investment (and associated implementation risk)
- Climate models may suggest that there will be significant change to suitability for existing varieties, even when GAP is applied[1]

And there are also scenarios where a mix of renovation and rehabilitation is the best way forward:

- Some parts of the plot may be completely damaged and thus require renovation, whereas others areas of the plot might require rehabilitation only

Source: Dalberg analysis and interviews

When possible, *gradual* rehabilitation should be preferred over renovation given its lower risk and cost for SHFs…

Rehabilitation can often achieve good yield uplifts at quicker speeds and lower costs than to renovation. Rehabilitation has the advantage of recuperating yields quicker than renovation. Typically, stumping or pruning can bring back yields within 1-3 years, whereas, on average, it takes about five years for a newly planted seedling to reach full productivity.[1] Rehabilitation also has the added benefit of building on the old root net of the tree – which is less susceptible to drought and diseases than seedlings and young trees. Finally, rehabilitation comes at lower costs and risks since SHFs do not have to source, and verify, seedlings, and there are fewer costs involved with rehabilitation over renovation.

Interviews with coffee experts in Kenya indicated that even very old coffee trees – 50-70 years – could be rehabilitated on a regular basis (pruning every five to six years) and still provide good yields

However, some situations such as severe disease outbreaks, extremely old trees, or changing climatic conditions demand renovation. Rehabilitation cannot remedy severe outbreaks of disease, where for example the root of the tree gets damaged. Similarly, at some point, the tree age becomes too high for any rehabilitation practices to recoup yields[3]. Changing climatic conditions may also require SHFs to replant with more drought/disease resistant varieties, although these dynamics are very hard to predict currently.

If possible, interventions should be conducted on a gradual basis, with the SHF replanting or rehabilitating around 10-20% of the land every year. The biggest, though not the only, barrier preventing R&R investments is lack of finance. Most SHFs do not have access to affordable and appropriate finance that can help cover the 'valley of death' that takes place while a new or stumped/pruned tree grows to maximum yield. To overcome this barrier, SHFs should conduct R&R on a gradual basis, and focus on replanting or rehabilitating 5-20 % of the land per year based on trees age, health and performance. In severe situations (e.g. the majority of the land is severely impacted by disease, or trees are extremely old and in poor condition), R&R can be conducted at up to 25-35% of the land per year. Gradual R&R allows SHFs to maintain the majority of their income while continuously renewing their tree stock. While this trade off is a necessary, and a built-in component of large farm practices, it might be harder for economically pressed SHFs to make this decision. Gradual R&R might also be irrelevant for very small plot sizes (e.g. < 0.5 hectares).

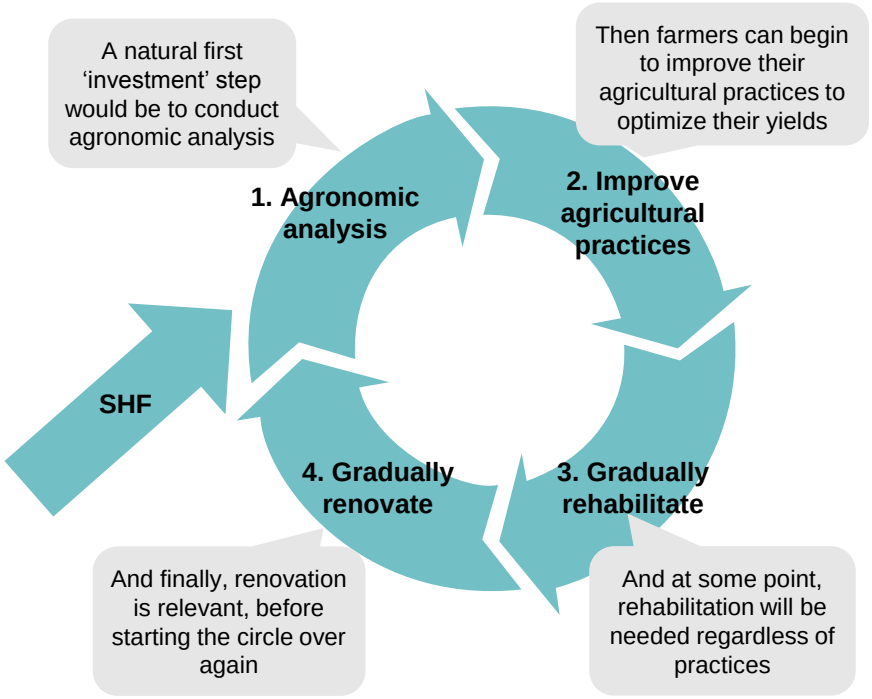
Notes: (1) Root Capital, *Financing Farm Renovation: How to Build Resilience Using a Blend of Capital,* 2016; (2) The exact age when rehabilitation can no longer replace declining yields due to age is not the same across all trees and places. Source: Dalberg interviews

…and investments should attempt to gradually bring SHFs into a cycle of reinvestment, unless circumstances require immediate renovation

A natural trajectory would be to invest in simpler, cheaper R&R programs first to get SHFs investing…

Ideally, farmers should be gradually incentivized and trained to reinvest in their coffee land as part of standard operating procedures. This will likely require starting with the more simple and cheaper investments first, before moving to more complex renovation investments that eventually entail that farmers continuously reinvest in their land

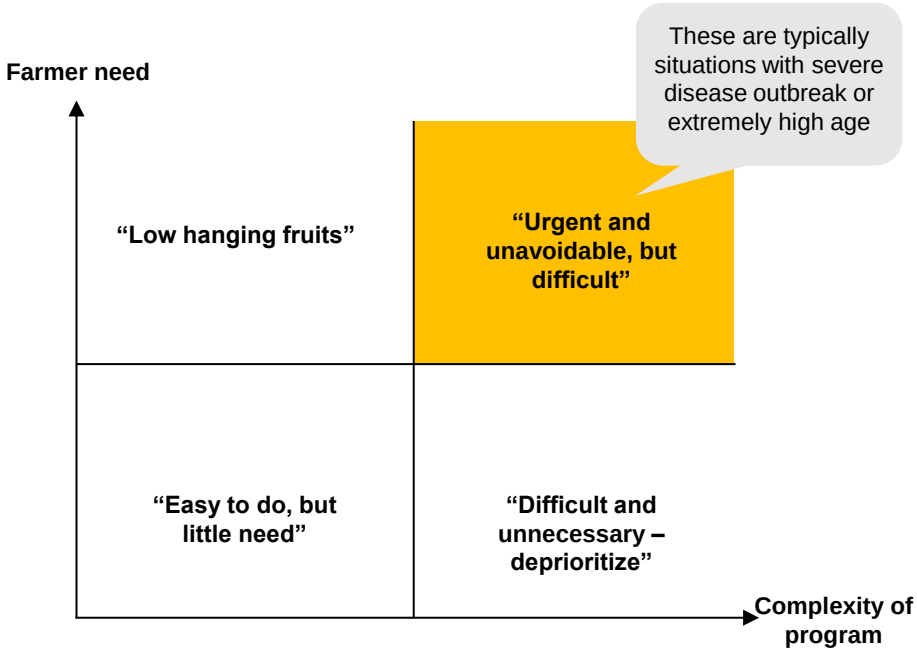
The SHF R&R reinvestment cycle



…but circumstances sometimes require that farmers need to get over a 'hump' of renovation

In cases of severe disease outbreak or high tree age, it will not make sense to start with simple investments. Here, farmers must make the 'jump" to highly complex and risky renovation programs in order to save their coffee fields (they must get over the "hump" of current renovation needs) but they often have to do so without experience in R&R and good agricultural practices

Connection between SHF need and R&R complexity



Source: Dalberg analysis

The R&R decision tree: the three question types create a sequence of questions that leads to a R&R project outcome in a given context

To get to a program outcome, we have summarized the following questions for three segments – these eight questions represent a summary of the previous slides on coffee viability, farmer segmentation, and detailed R&R need:

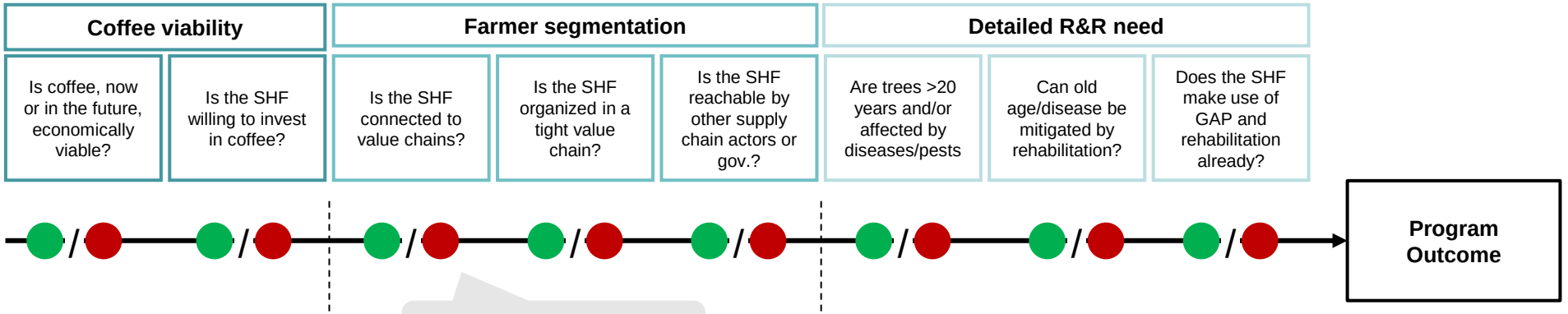
Coffee viability		Farmer segmentation			Detailed R&R need		
Is coffee, now or in the future, economically viable?	Is the SHF willing to invest in coffee?	Is the SHF connected to value chains?	Is the SHF organized in a tight value chain?	Is the SHF reachable by other supply chain actors or gov.?	Are trees >20 years and/or affected by diseases/pests	Can old age/disease be mitigated by rehabilitation?	Does the SHF make use of GAP and rehabilitation already?

For each of these questions, stakeholders can answer 'yes' or 'no', which will ultimately lead to determine:

- Whether renovation, rehabilitation, or a "do nothing" is needed?
- Whether financing should be done mostly though loans or grants?
- Whether there are other, more important, priorities than R&R?

Note that if the answer to either one of the first two questions under coffee viability is 'no' – the farmer segmentation and R&R need questions become irrelevant

The R&R decision tree: each question type determines a particular design outcome which, when combined, determine the R&R program



Determines:
- Whether R&R is relevant or whether adaption programs/other rural investments are more relevant

Design outcome:
- Whether R&R is at all feasible and relevant

Determines:
- Which segment of the farmer pyramid the farmer is in
- How easy farmers are to serve and finance and how big the need for broader supporting measures (next to R&R)?

Design outcome:
- The mix of financing via loans and/or grants

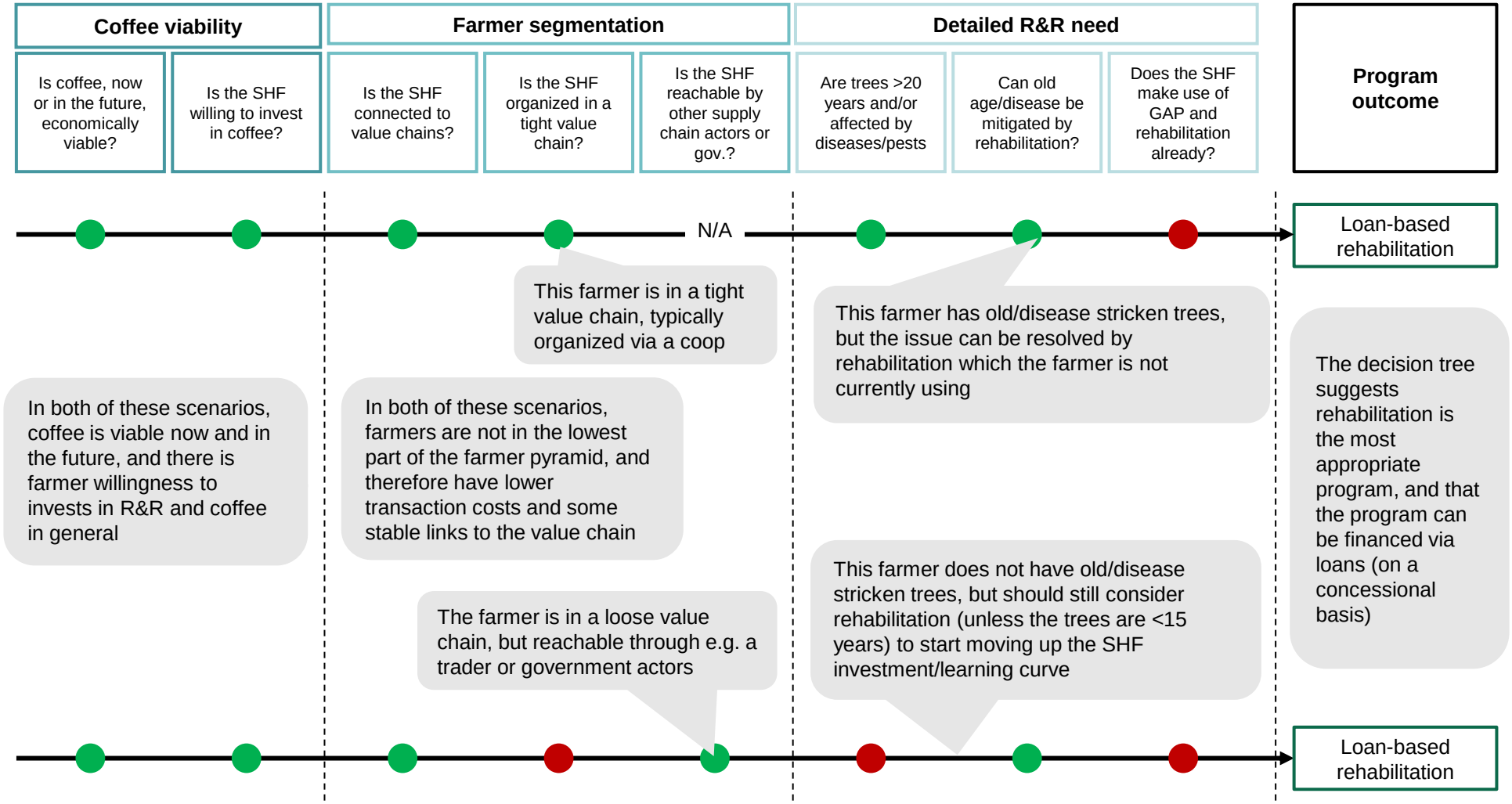
Determines:
- The state of trees
- Whether rehabilitation can bring back yields or whether renovation is needed
- Current agricultural practices

Design outcome:
- Renovation or rehabilitation program

Legend:
yes no

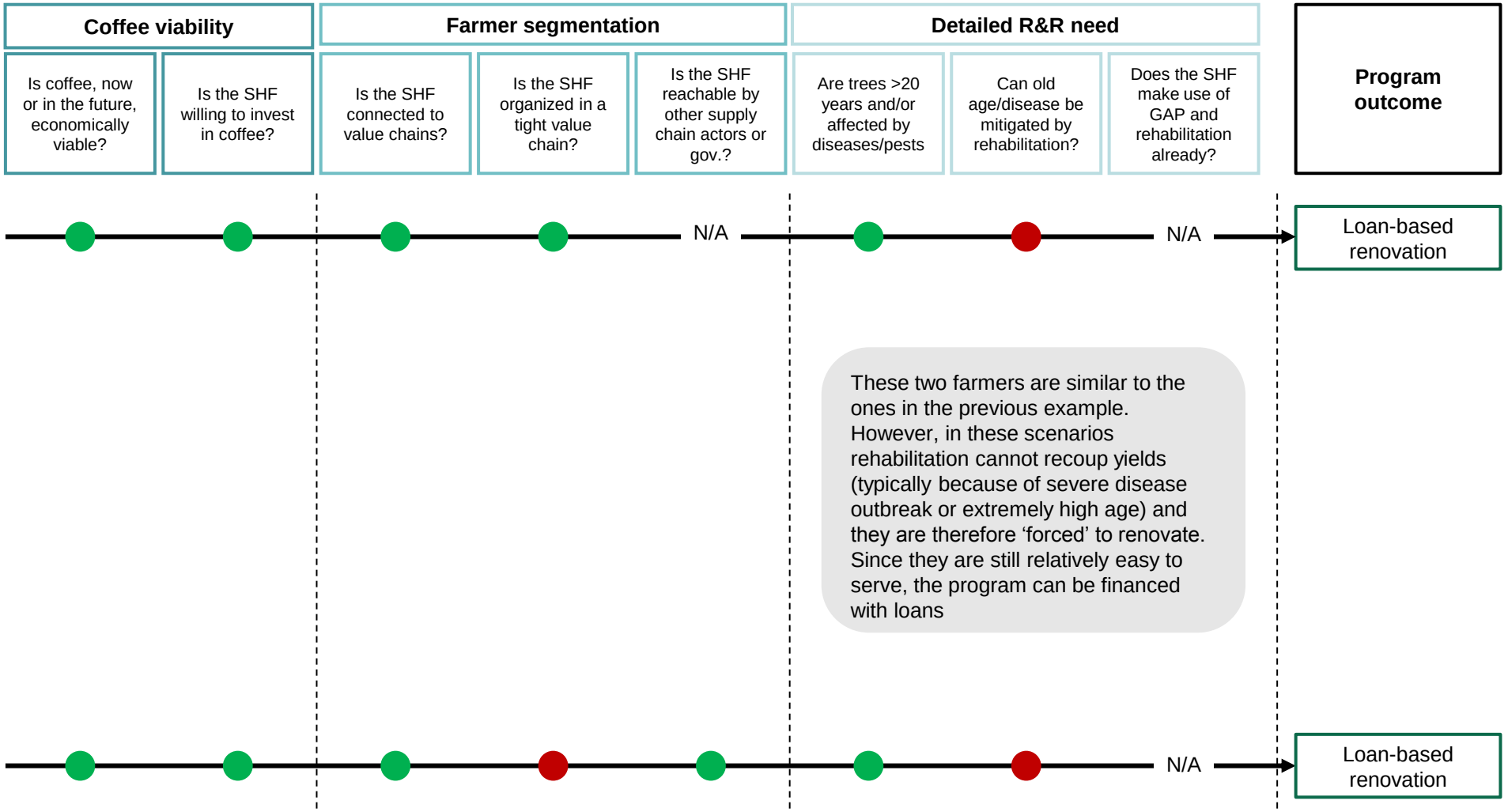
Source: Dalberg analysis

The R&R decision tree: two scenarios both lead to loan-based rehabilitation programs



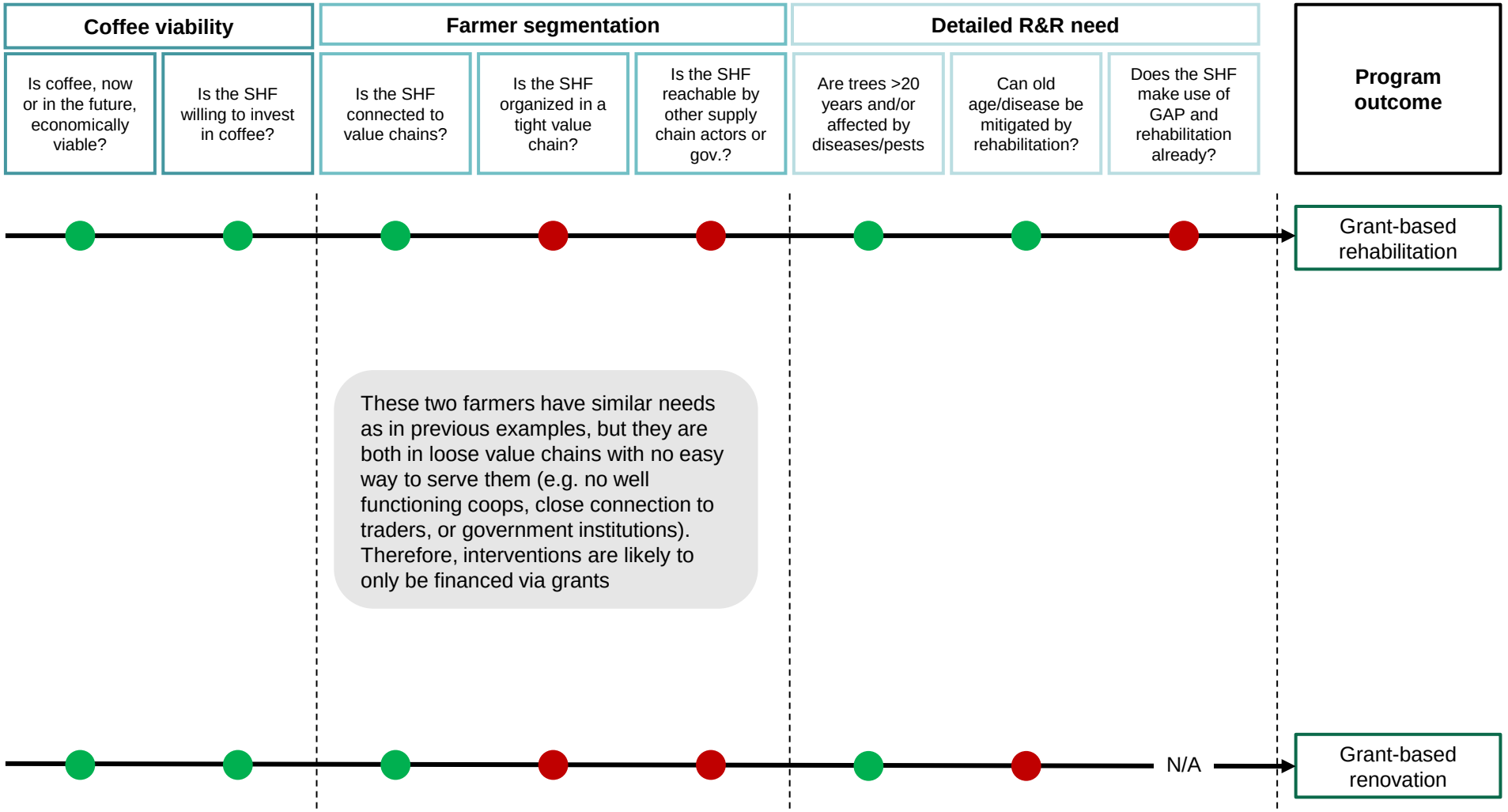
Source: Dalberg analysis

The R&R decision tree: two scenarios both lead to loan-based renovation programs



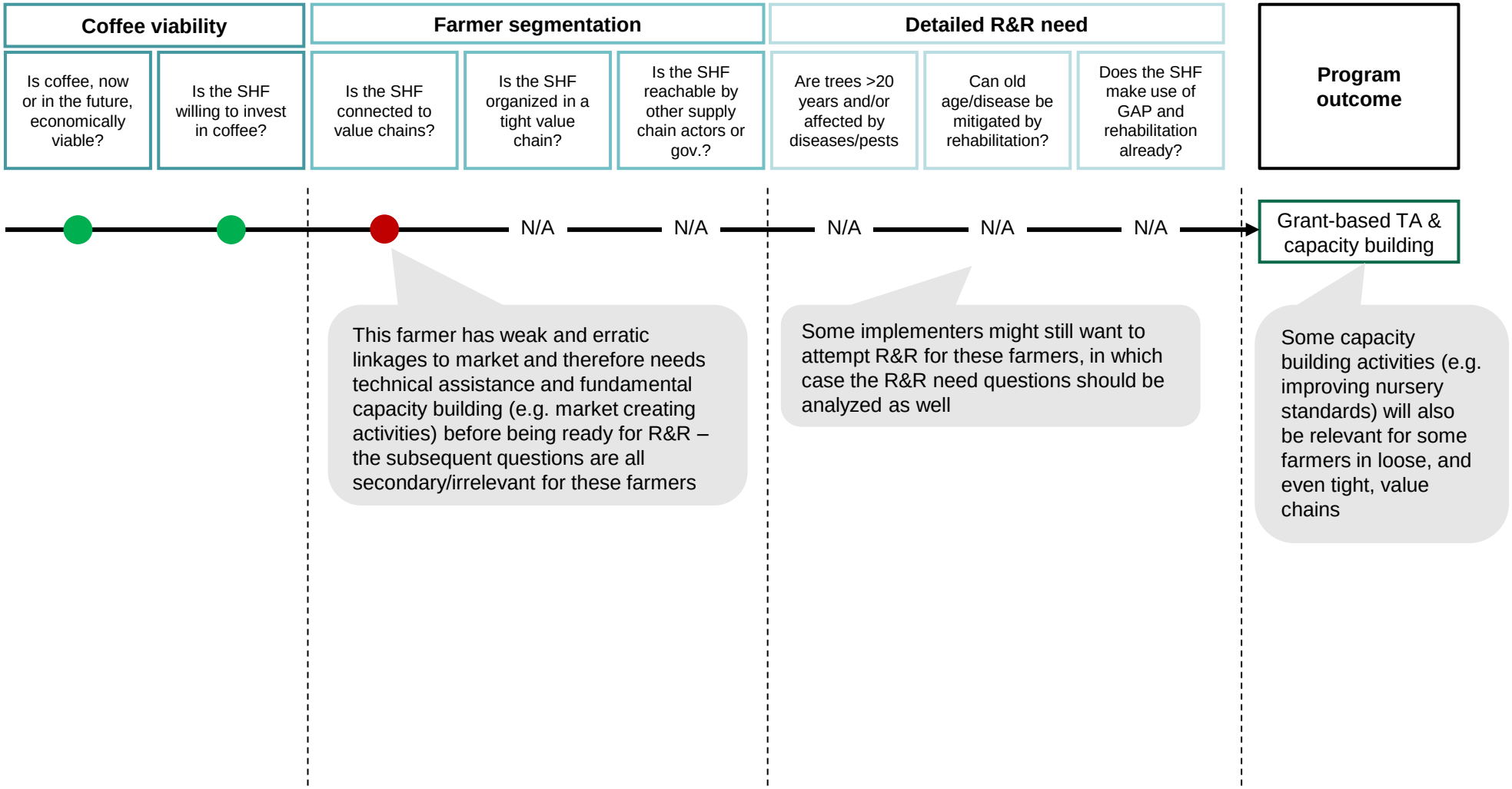
Source: Dalberg analysis

The R&R decision tree: two scenarios both lead to grant-based R&R programs



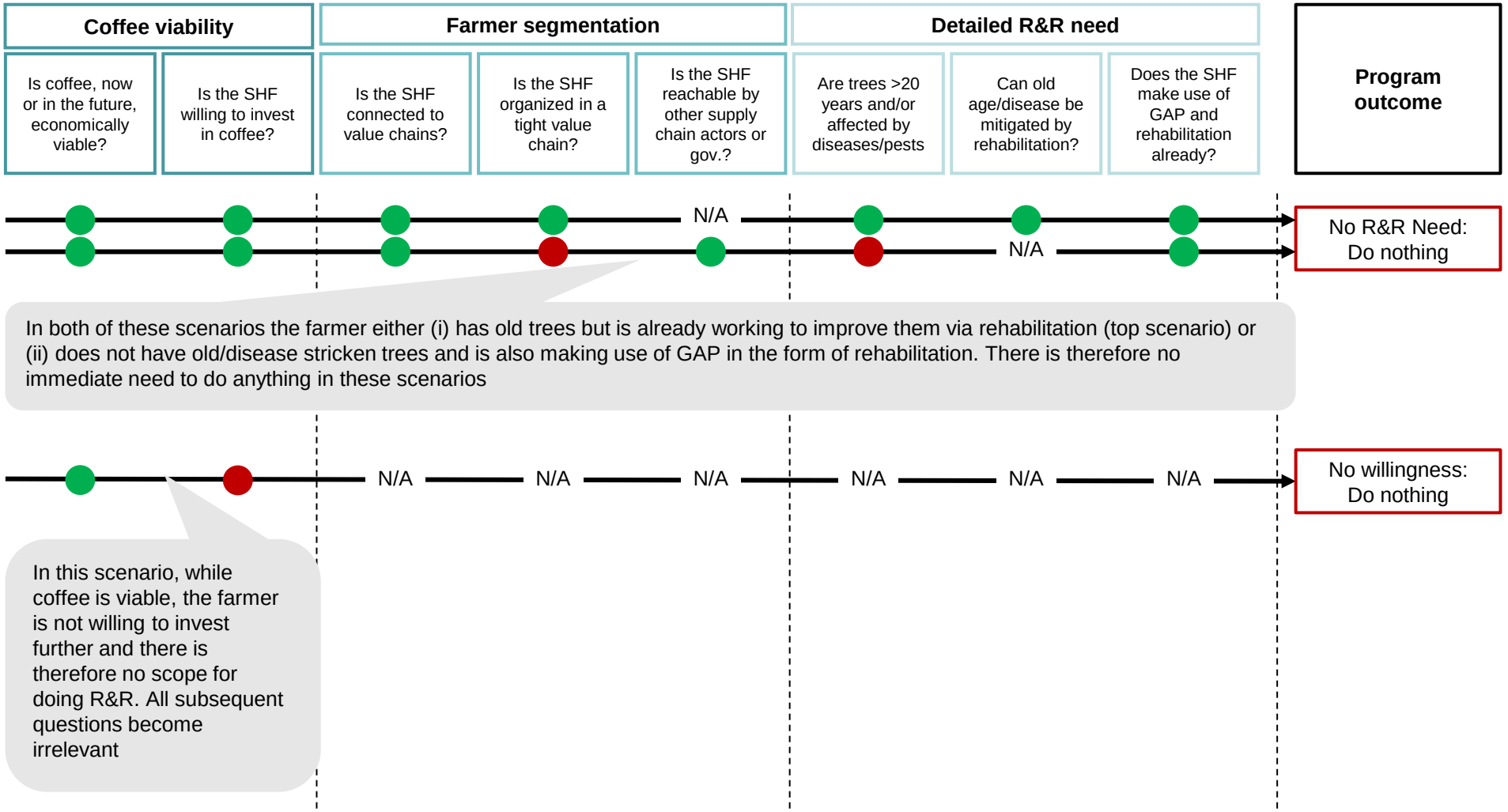
Source: Dalberg analysis

The R&R decision tree: one scenario leads to grant-based technical assistance and capacity building



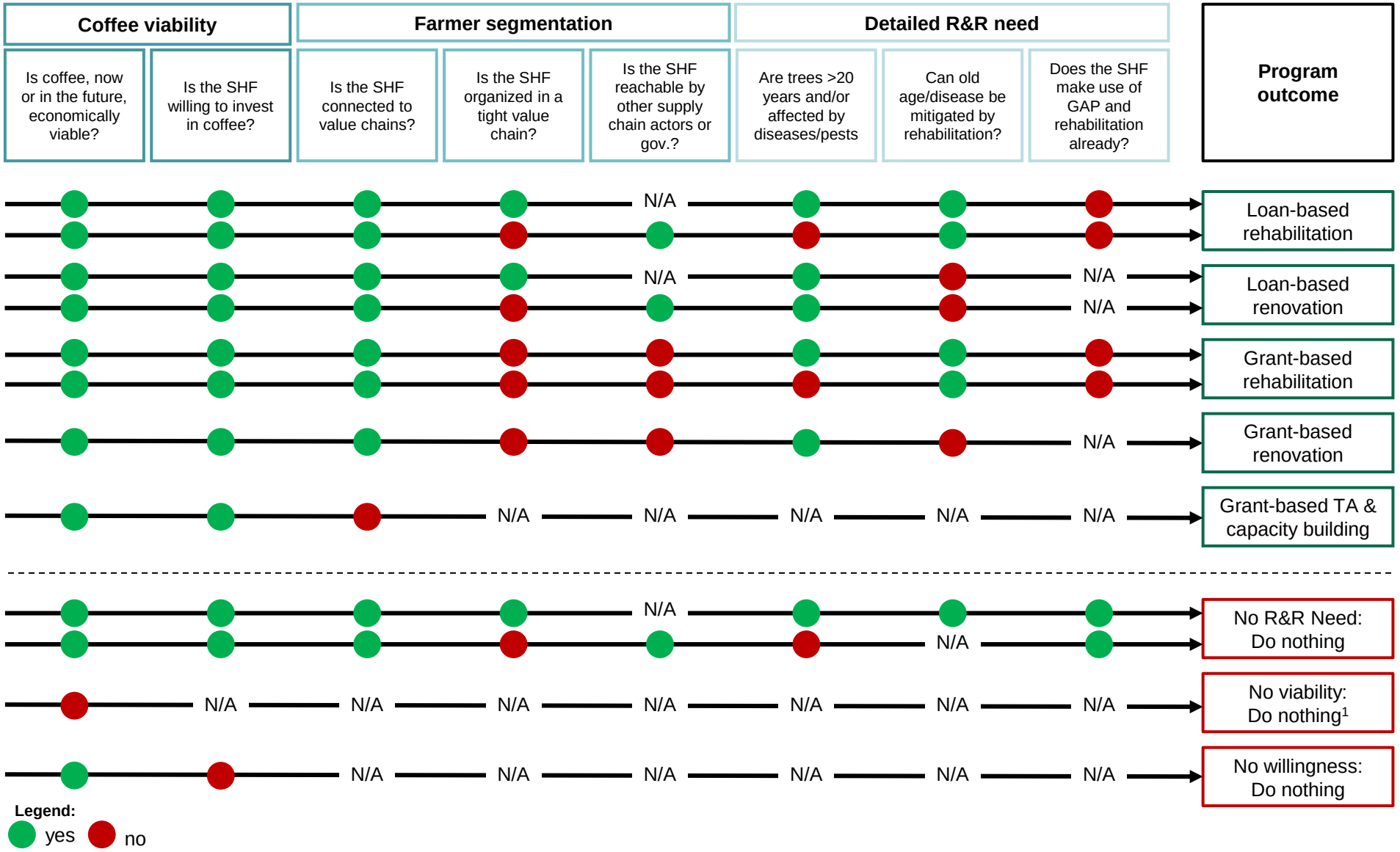
Source: Dalberg analysis

The R&R decision tree: three scenarios lead to “do nothing” outcomes (or adaptation programs)



Source: Dalberg analysis

The R&R decision tree: in total, there are five types of action oriented outcomes and three types of "do nothing" outcomes

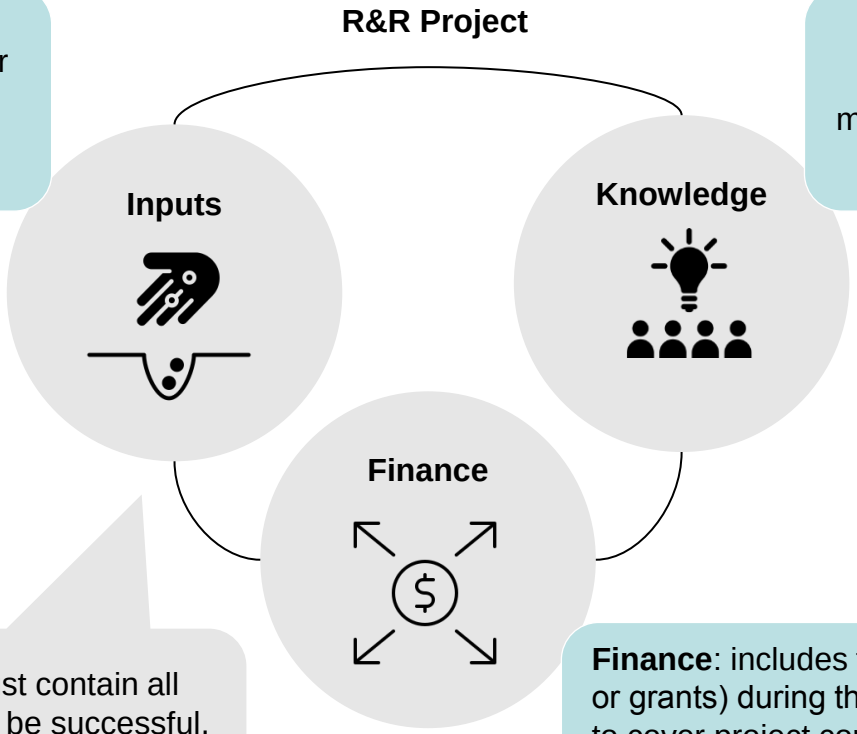


Notes: (1) No viability situations could also focus on adaptation programs to more climate robust crops. Source: Dalberg analysis

Contents

Following the decision tree analysis, stakeholders must decide *how* to implement three project R&R components: inputs, finance, and knowledge

Inputs: includes planting material (for renovation), insetting trees (for shaded coffee), and other inputs such as nutrition, tools, and herbicide



Knowledge: Includes technical assistance on GAP and management of long-term loans and R&R programs

R&R programs must contain all three components to be successful, though the sub components differ for renovation and rehabilitation

Finance: includes financing (loans or grants) during the 'valley of death' to cover project components, and, sometimes, broader investments in coffee sector

Conceptually, these program components are very simple to outline. However, they can be very complicated to deliver effectively – the short case studies included in this section and the long case studies in Section 5 speak to their application in the real world

Some inputs are critical to include in renovation packages, whereas others could be left for the farmers to source independently

Finance covers the costs of the inputs throughout, though the biggest need for finance is upfront

Tools to uproot: For renovation, SHFs need to uproot their trees and dig holes for planting new trees. Farmers will typically have these tools available, though the time to prepare can be shortened by using electronic drills

Timing: Needed for uprooting

Cost: Typically between 5-10% of renovation costs

Labor: SHFs need to prepare and the soil and uproot old trees before planting new ones. Many varieties require extra care in the first couple of years which require extra labor

Timing: Mostly at the beginning of the project, but needed throughout

Cost: Typically between 60-70% of renovation costs

Planting material: SHFs need access to high quality (and ideally verifiable) seedlings. These should either be sourced from a local nursery or imported. Farmers must be informed about pros and cons of different seedlings

Timing: If seedlings are not delivered during rainy season, and if irrigation is lacking, seedlings risk dying

Cost: Typically between 15-30% of renovation costs

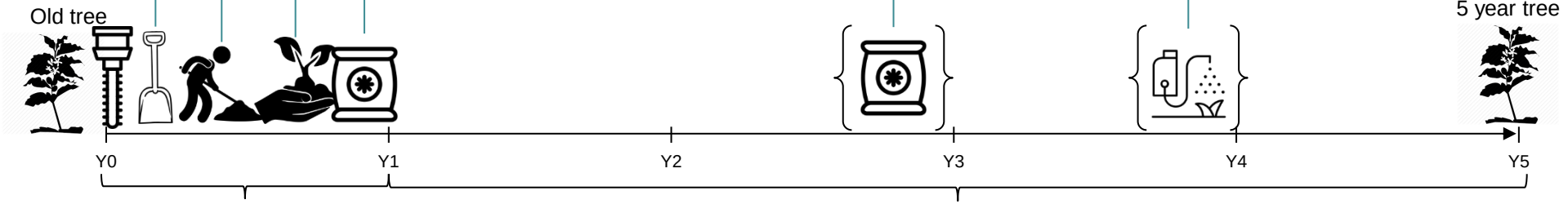
Nutrition: It is CRITICAL to have the correct application of nutrition. It should both be applied during planting, and potentially ongoing to keep the tree nourished .

Timing: Most importantly needed upfront
Cost: Varies – if sourced from supplier more expensive than if produced locally **–** e.g. 10-20% of renovation costs

Herbicides: Only needed in situations where disease outbreak or pests are a risk to implementation success. Whenever possible, herbicides should be avoided.

Timing: Varies – but needs to be available quickly if disease spreads or if there is a pest attack

Cost: Depends on severity of outbreak – normally not included in renovation costs



Upfront inputs in first year – majority of costs

Running inputs

Legend:
Critical importance
Nice to have

Renovation

Source: Dalberg analysis

Rehabilitation requires fewer inputs than renovation and none of the inputs are critical, though finance is needed in most cases

Finance covers the costs of the inputs throughout, though the biggest need for finance is upfront

Labor: SHFs need to conduct the pruning and rehabilitation – either on a one off basis or through rounds in the first couple of years (e.g. side-pruning before stumping)

Timing: Mostly at the beginning of the project, but needed throughout

Cost: Typically between 60-80% of renovation costs

Tools to rehabilitate: Pruning shears or saws to stump trees – these will typically be available locally

Timing: Needed for pruning/stumping at beginning of period

Cost: 0-10% of rehabilitation costs[2]

Nutrition: It is CRITICAL to have the correct application of nutrition. It should both be applied after pruning, and potentially ongoing to keep the tree nourished

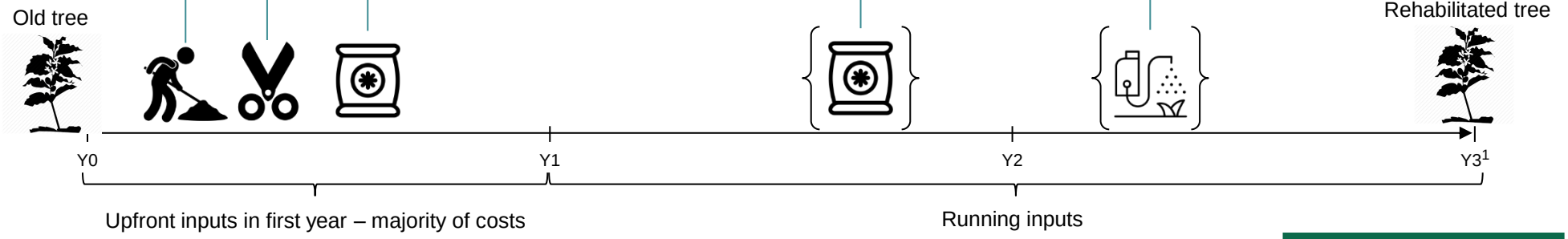
Timing: Most importantly needed upfront

Cost: Varies – if sourced from supplier more expensive than if produced locally **–** e.g. 15-35% of rehabilitation costs

Herbicides: Only needed in situations where disease outbreak or pests are a risk to implementation success. Whenever possible, herbicides should be avoided.

Timing: Varies – but needs to be available quickly if disease spreads or if there is a pest attack

Cost: Depends on severity of outbreak – normally not included in rehabilitation costs



Legend:
Critical importance
Nice to have

Rehabilitation

Notes: (1) Some rehabilitation programs might take less than three years to complete. Source: Dalberg analysis;

Well functioning nurseries safeguard planting material quality, but nurseries' capacity varies and is often low

Nurseries are indispensable for renovation programs

- Nurseries are responsible for managing, growing, and selling seedlings to farmers
- Nurseries are sometimes placed centrally in a country, but can also be co-managed by a small group of farmers

Nurseries often produce low quality, unverifiable seedlings

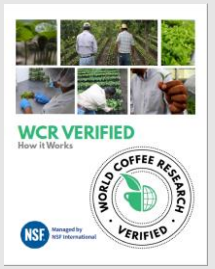
- **Limited adaptation of best practices:** There are currently little use of 'best practices' for nurseries and interviews indicated that nursery standards are often severely lacking
- **No verification:** Farmers risk that seedlings for new trees are not guaranteed to conform to quality, genetic purity, and variety standards. The lack of certified seed and seedling schemes can result in poor quality plants and seeds and fraudulent seed purchases, which lowers productivity at the farm level.

Lessons learned from the field

- **Shared responsibility:** It is important to hold nurseries co-responsible for quality of planting material and in particular, survival rates of seedlings
- **Transportation costs:** Nursery transportation costs may be prohibitive to renovation efforts: nurseries that are located near farms support the quality of seedlings and avoid some of the costs of transportation

Guides for implementers

World Coffee Research (WCR) has set up a **nursery certification program**. "WCR Verified[SM]" is the first global standard to certify that coffee seed producers and plant nurseries are producing healthy and genetically pure plants. The verification program deals with many of the challenges mentioned on this page. The program is live in Central America, and there are plans to roll out globally after 2018 Read more



The **Coffee & Climate toolbox**[1] is an online toolbox that, among other things, includes lessons on how nurseries can improve the quality of seedlings. It also includes lessons on planting guides for farmers. Read more

Notes: This is supported by HRNS. Source: World Coffee Research, *World coffee research verified: Seed verification for healthy, genetically pure plants, 2017;*

Farmers must also have adequate information on coffee varieties and weigh up multiple factors before deciding on what to plant

Deciding *what* to plant is essential to get right for farmers

- Owing to coffee trees' long lifespan, the decision farmers make about which variety to plant will have long-stretching consequences.
- Farmers must also consider whether they want to plant shading trees

Farmers must consider a sequence of questions to get to the optimum variety

1. **Principal question:** Farmers must decide whether they want to sell to a specialty market and if she/he has the right conditions to do so (e.g. optimal altitude) – if so, then a variety with a high cup (high quality) potential is essential
2. **Main characteristics:** Yield potential, optimal altitude, rust and other disease resistances, and nutrition requirements[1]
3. **Main trade offs:** Farmers must weigh up trade offs between varieties as no single variety is "perfect":
    1. In older varieties, there is often a trade off between rust resistance and quality
    2. Higher yield potentials that require more inputs, versus low care varieties that can be left unattended for a year or two
    3. Best quality varieties with fewest other trade offs (e.g. F1 hybrids) are expensive, hard to access, and require extra care in the first couple of years

But farmers will need support to reach a decision (lessons learned from the field)

- **Lacking knowledge:** Interviews stressed that farmers across all regions lack access to information on the pros and cons of different varieties
- **TA need:** There is a need to educate farmers on appropriate varieties and shade trees – training must be followed up during the actual planting process.
- **Inclusive decision making:** Farmers must be included in the decision making process as implementers have had bad experiences with 'top-down' decisions
- **Conflicting messages:** coops/farmers sometimes get mixed messages on which varieties to use from buyers and agronomists.[2] There is a need to align these recommendations
- **Biodiversity:** biodiversity is important to ensure soil nutrition and long-term viability

Guide and best practices for implementers

World Coffee Research (WCR) has launched a **coffee varieties catalogue** that lists and compares 33 key varieties in Mesoamerica and The Caribbean. Farmers can be educated on the pros and cons of the different varieties. WCR plan to expand the catalogue to East Africa as well. Read more

Nespresso implements agroforestry projects in its supply chain to "inset" its carbon emissions. Pur Project and Rainforest Alliance assist Nespresso to design agroforestry projects that preserve natural ecosystems, improve quality of soil and water, and have positive impact on the quality and quantity of coffee produced. **Insetting** may play a more dominant role in coffee production in the future, given climate change.

'**Horizontal' and 'vertical' resistance to diseases.** If farmers mostly plant the same varieties, and the resistance of these plants to a given disease results from a single gene ('vertical resistance'), then the sector as whole is very vulnerable if the diseases evolve to 'get around' the one gene. Ensuring greater genetic diversity (through more varieties being planted) and greater focus on horizontal resistance (multiple genetic sources of partial resistance, rather than single gene sources) will both contribute to coffee resilience in the long term as any evolution of a disease will not be catastrophic.

Notes: (1) There are additional factors that are typically less important, but which the farmer must still consider before choosing, e.g. planting density, time to reach first harvest, amount of care needed in the first couple of years, etc.; (2) Based on whether they should consider cup quality versus productivity for example. Source: World Coffee Research, *World coffee research verified: Seed verification for healthy, genetically pure plants,* 2017; Dalberg interviews

Other common input challenges include expanding farmer knowledge on nutrition

Challenge type	Examples	Lessons from the field to overcome the challenge
Other inputs: Nutrition cost and applicability	• Nutrition is often expensive, and therefore requires financing or cost reduction • One of the substantial barriers to farmer use of fertilizer is the extra burden of sales and other taxes, and in many instances this amount can make the difference in whether to invest or not • Farmers lack capacity and skills to perform soil analysis and have limited knowledge on correct nutrition use • Farmers lack knowledge of alternatives to chemical nutrition	• Nutrition costs can be brought down significantly by producing it locally • Support for soil analysis at SHF level can optimize use of inputs • Education on biodiversity/agroforestry is important to include in planting instructions to ensure long-term viability of the coffee trees • Traders can negotiate bulk rates to reduce input costs

NCBA CLUSA, in partnership with MAOES[1], recently published a guidebook[2] to help farmers produce their own **organic fertilizers**. Fertilizers are based on locally-sourced raw material such as organic materials, chicken manure or cane honey. Natural fertilizers reduce the pressure on soil and ecosystems and are significantly less expensive than imported fertilizers used in non-organic agriculture.

Most SHFs have little or no knowledge on which inputs (seedlings and fertilizers) are most suited to their land. As part of their **Direct Trade Verified Sustainable** (DTVS) Program, Farmer Brothers performed soil analysis as a precondition for intervention. Soil analyses are co-financed by the FNC, Farmer Brothers and farmers themselves, and help optimize the use of inputs by giving a clear picture of soil requirements and needs.

Notes: (1) Movimiento de Agricultura Orgánica de El Salvador. (2) NCBA CLUSA, USDA and MAOES, *Manual de Producción de insumos utilizados en agricultura orgánica,* 2016
Source: Dalberg interviews

Technical assistance is a continuous process that is relevant for SHFs and R&R supporting organizations such as coops and nurseries

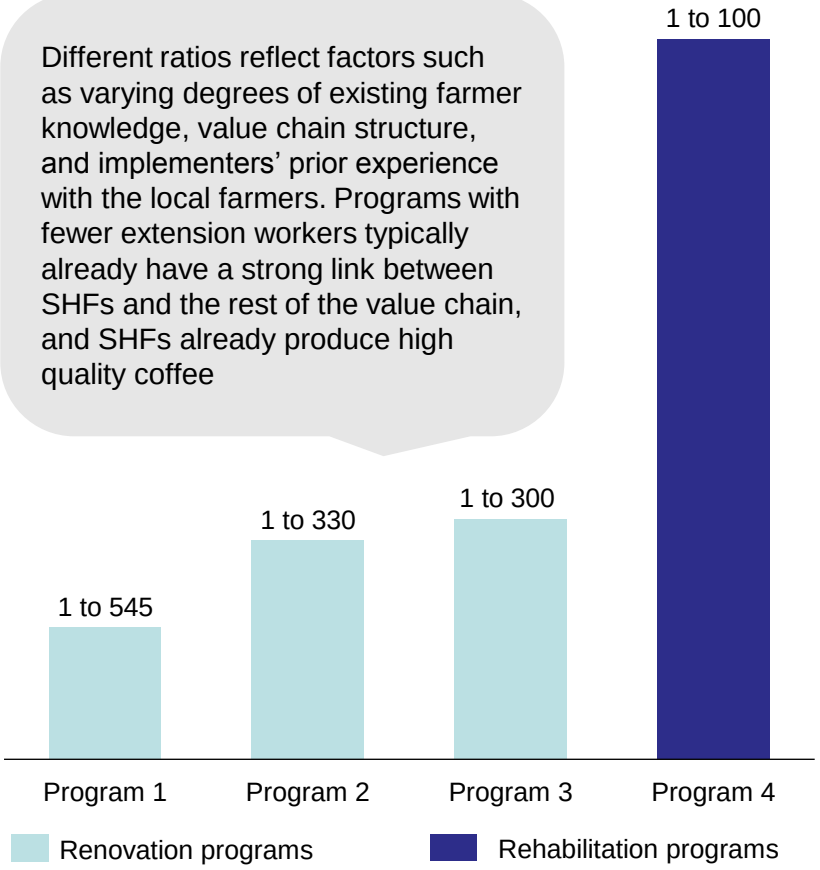
R&R actor	Before: Training	During: Training and monitoring	After: Evaluation
Smallholder farmers	• Implement renovation training programs and select approach (e.g. total/rolling) • Select lead farmers that can function as pilot plots • Perform/train SHFs to conduct soil analysis	• Monitor replanting efforts and make sure that SHFs implement good agricultural practices • Implement follow up training programs adjusted to SHF needs (e.g. how to manage nematodes)	• Conduct evaluation of replanting programs and analyze data on failure and success rates
Coops	• In cases where loans are dispersed through local coops, stakeholders must educate coops on how to manage long-term loans • Make sure that SHF org./extension service worker is adequately equipped	• Monitoring should take place to ensure that coops (or other farmer organizations) are operating according to required standards	• No TA likely needed
Finance providers	• Finance providers without experience in dispersing R&R loans must be trained on how to manage these loans • Advocacy efforts to persuade local FIs to lend to SHFs for R&R	• No TA likely needed	• No TA likely needed
Nurseries	• Nurseries often need capacity building and training to become certified and be able to produce high quality seedlings in commercial quantities	• Some monitoring is likely required to ensure that nurseries are retain quality standards. Genetic testing should be continued (e.g. through the World Coffee Research nursery certification program)	• No TA likely needed

Source: Dalberg analysis and interviews

Technical assistance should be deployed heavily upfront, and there is a need for substantial local presence

Ratio of extension officer or TA provider to SHFs
1 extension officer to # of SHFs

Different ratios reflect factors such as varying degrees of existing farmer knowledge, value chain structure, and implementers' prior experience with the local farmers. Programs with fewer extension workers typically already have a strong link between SHFs and the rest of the value chain, and SHFs already produce high quality coffee



Insights from the field on technical assistance (Dalberg interviews)

"*Technical Assistance is a critical part of any renovation program. New plants require new fertilization practices, new planting practices. Ideally, extension officers will stay one or two days in the farms to show farmers how to manage their new plants*"

"*We need 1 agronomist for 100 farmers, especially in the three first years. Then, the ratio decreases*"

"TA needs to be closely aligned and connected to suppliers, nurseries, private agronomists, etc. to ensure consistent communication/education for farmers throughout the supply chain"

"*The success of the program relies on this one key person, who is in charge of monitoring the farms and of providing TA. […] The person should be local and speak the language of the farmers*"

"Most SHF organizations are perpetually scrounging for support from short-term NGO projects or donors for technical assistance – there is a need for increased resources for technical assistance"

"It takes a lot of people to do TA in the field, and it comes with high costs – but the reality is that a lot of countries don't have enough professional extension service providers to do this"

Notes: (1) The Coffee Initiative recruits and trains 'farmer trainers' to deliver TA training to groups of farmers - they typically train between 9 and 13 groups of 30 farmers. Source: Dalberg analysis and interviews

Common knowledge challenges include tailoring of TA, and creating farmer incentive structures that support uptake of GAP

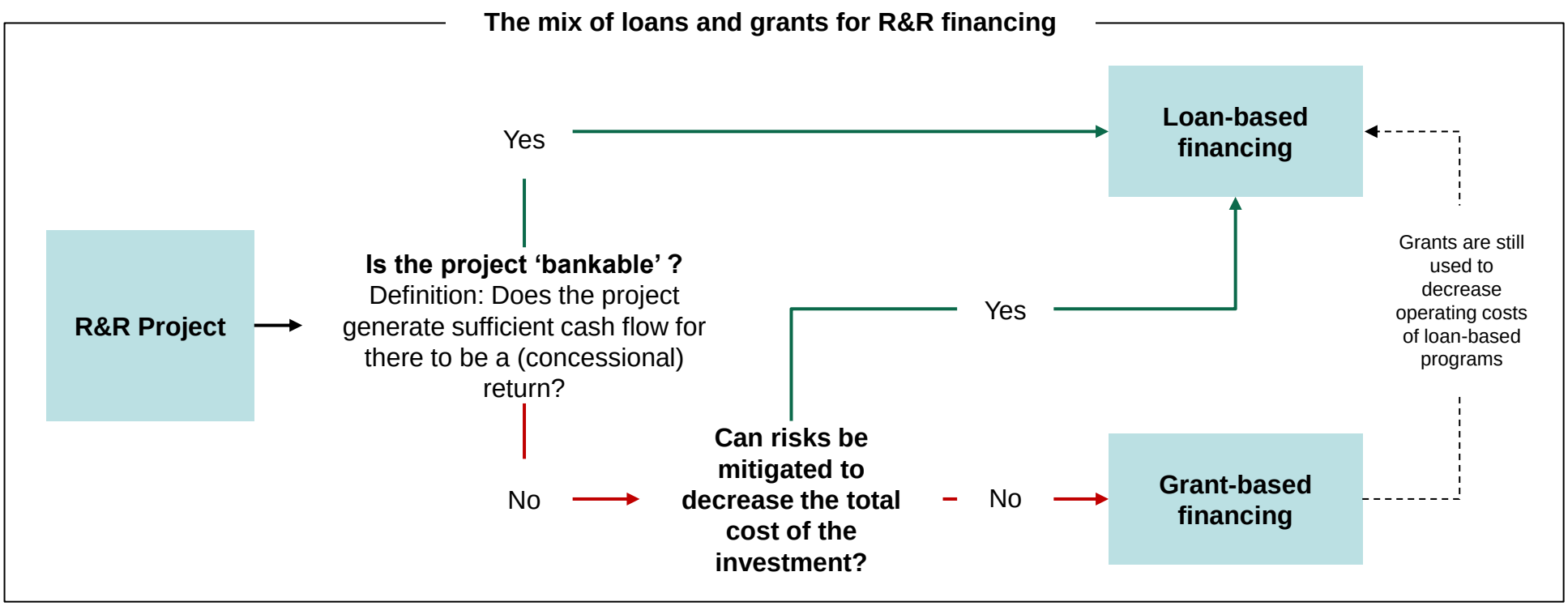
Challenge type	Examples	Lessons from the field to overcome the challenge
Diversity of needs:	• While there are some general 'best practices' in coffee farming that can be applied everywhere, agricultural practices must also be tailored to local context and needs • Sub regions of the same country can have different TA needs and different local languages, requiring highly tailored TA	• Important to build a baseline of GAP adoption among farmers to allow for a tailored diagnostic of TA needs among farmers • Important to understand the producers' needs and to design TA in a collaborative approach • Best practices must be tailored to local needs including the altitude and the needs of the specific type of varietal.
Insufficient absorptive capacity / uptake challenges:	• Difficult to design knowledge programs that ensure full implementation by SHFs • Nurseries / other intermediaries need to be able to pass the information on GAP for new varietals: the information can can change drastically from the former varietals • TA also needs to be "distributed" to finance providers that are not used to handling long-term loans – e.g. cash-flow management of long-term debt	• Important to design the right incentive structure to achieve high uptake of GAP. Farmers Field Schools (with "lead farmers"/"role models") have a good track record spreading GAPs among SHFs • Price transparency and quality premiums to farmers are tools that help incentivize uptake of GAP

In Guatemala, a renovation program **provided F1 hybrid seedlings in plastic bags** to SHFs. Farmers had never received seedlings in a plastic bag before, and the program implementers did not consider farmers' lacking experience. Many farmers did not remove the bag before planting the seedlings and as a result, the roots were severely compromised. This example highlights the need for highly personalized and need-based trainings, especially in the first phase of a renovation program.

The **Plan Integral de Atención al Café** (PIAC), implemented by the Mexican Secretary of Agriculture (SAGARPA) was designed collaboratively with farmers. The SAGARPA invited farmer organizations to detail their needs, and build the PIAC to address them. The SAGARPA works with 400 native agronomists to address the large differences in local needs (e.g. over 60 regional languages spoken).

Source: Dalberg interviews

The mix of grants and loans depends on the 'bankability' of the R&R investment, and whether mitigation measures can decrease risks sufficiently



Ultimately, if the project does not generate acceptable return for a potential investor (whose risk-return expectations will vary), or the mitigation measures cannot bring down the total cost of the investment, then the project will have to financed via a grant. Since the project is not bankable, that typically means that the investment case must be impact focused (e.g. improving livelihoods) rather than return focused. Even if the project is bankable, high operating costs will likely have to be covered by a grant/subsidy

Source: Dalberg analysis and interviews

Potential investors must go through a three step process to identify whether loans or grants should be the prominent financing instrument

1 Cash flow analysis

R&R loans are cash flow loans where terms and conditions are based on expected future cash flows (from increased coffee production/sales) rather than asset-backed loans (unless coops provide collateral).

At the most basic level, the farmer must obtain a profit from doing R&R which he/she can use to pay back a loan

For a R&R investment to be profitable, the 'net present value' (NPV)[1] of total investment out- and inflows, over the lifespan of the project, must be positive

We calculate the NPV of the project by modelling the cash flow of the project over time.

2 Risk assessment

Following the cash flow analysis, risks need to be understood, and their likely impact on potential repayment estimated. Usually this risk assessment takes place via sensitivity testing, which estimates how each of the risks (see below) will impact the profitability and total cost of the investment

There are a number of risks[2] which all influence R&R investments:

- **Agricultural risks:**
  - **Production:** Include weather events, pest and disease outbreaks
  - **Enabling environment:** Include changes in regulations, macro-economic environment, political risks, conflict, trade restrictions
  - **Market:** Include commodity and input price volatility, exchange rate and interest rate volatility, and counterparty default risk
- **Credit risk:** is the risk the borrower fails to make required payments. For the lender this might mean lost principal and interest, disruption to cash flows, and increased collection costs.
- **Other risks:** Country risk, FX risk; liquidity risks, etc.

3 Mitigation tools

A number of tools exist to mitigate the risks, and support the bankability of the investment.

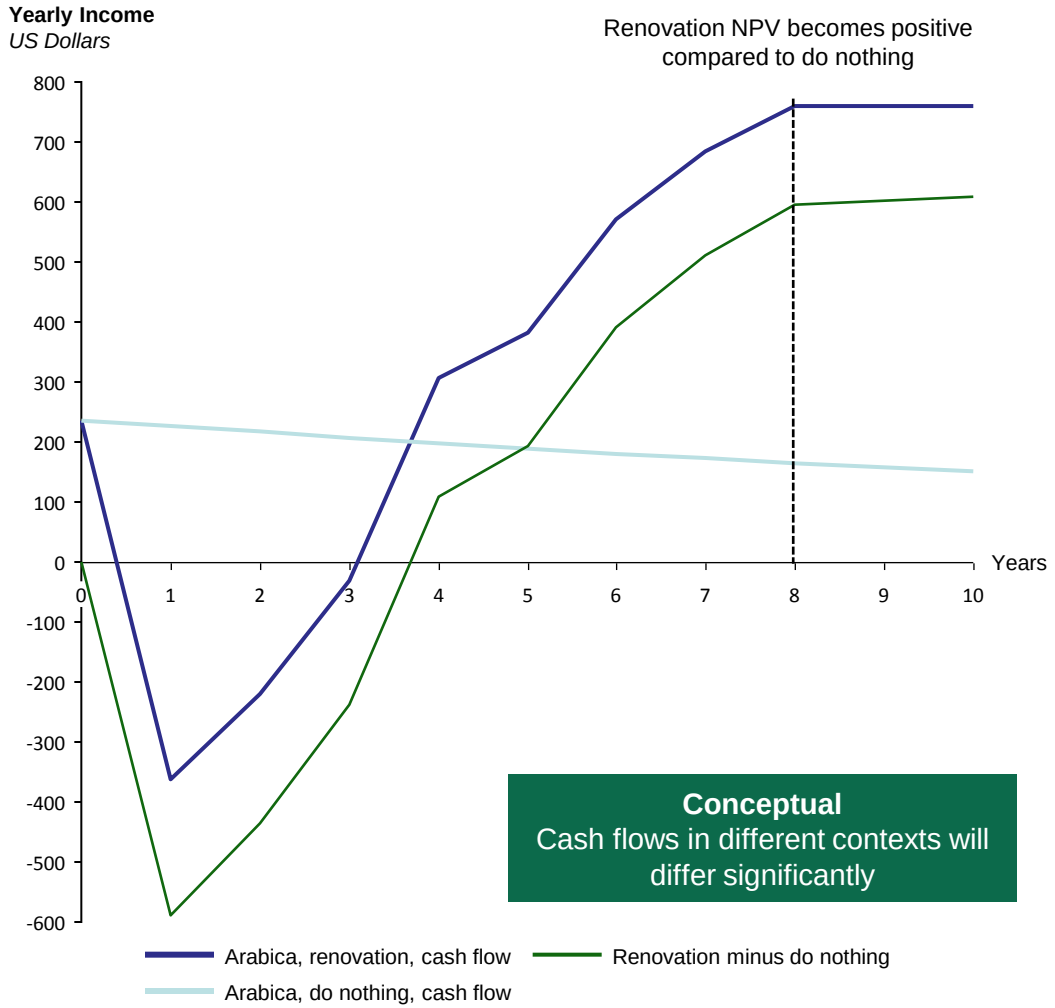
These are particularly challenging for R&R because the loans are based on projected future cash flow, rather than assets or collateral.

In addition, these risk mitigation tools (and the lending process as a whole) need to be proportionate in cost, otherwise they make the loan too expensive for the farmer (if she/he carries the cost), and that increases the credit risk, putting the whole system out of balance again….

Notes: (1) Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. (2) These categories of risk are highly inter-related e.g. high agricultural risk means the farmer might not be able to pay back the loan - increasing credit risk. Source: Dalberg analysis and interviews

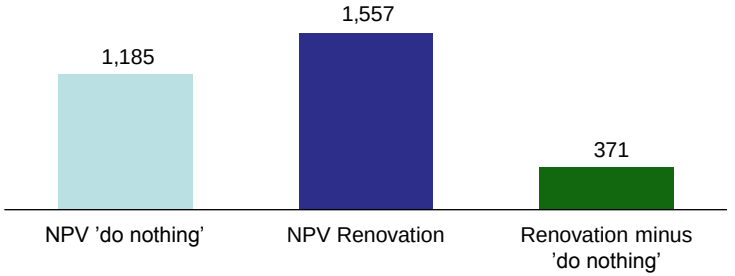
Cash flow analysis is the primary tool to help finance providers understand whether R&R projects *can be* bankable

Example: Renovation impact on farm net income for a Tanzanian Arabica farmer, compared to a "do nothing" scenario[1]



Conceptual
Cash flows in different contexts will differ significantly

Example 1: Net present value over 10 years
USD



Cash flow implications:

- In this example, the NPV for renovation after 10 years is around USD 1,500 and the NPV for the "do nothing" scenario is almost USD 1,200. The NPV for renovation minus "do nothing" is USD 371 – renovation is therefore the preferred investment and generates a profit
- However, the NPV of renovation is only preferable compared to a "do nothing" scenario after ~eight years, indicating the horizon needed for the investment to be worthwhile (e.g. up until eight years, "do nothing" is preferable)
- Even though the farmer's annual income is 3-4 times higher than the "do nothing" scenario after year 8 and onwards, it takes significant time to recoup the costs incurred during the "valley of death" (Y0-Y3) where the farmer is not making any income from the new tree

Notes: (1) Average age of trees is 34 years. Average plot size is 1 hectare. Discount rate is 10%. Cost of financing and training is not included. Farmgate prices are kept steady at USD 1.18/kg, Max yield for 'business as usual' is 200 kg/ha/year and max yield for renovation is 800 kg/hectare//year. Replanting cost of USD 350 and additional annual cost of USD 220. No costs for BAU. Scenario is for home-processed Arabica. Source: Dalberg analysis and interviews

The sensitivity analysis then tests the strength of the investment on common agricultural risks

By changing the input parameters (e.g. costs, price, yields) in the cash flow model, investors can estimate the impact of agricultural risks affecting the investment profitability.

Common sensitivity analysis factors include:

- Market risks: what happens to the NPV if price increases or decreases?
- Cost: what happens to the NPV if the cost of production increases?
- Uplift: what happens to the NPV if the expected yield uplift falls short?

Depending on the investor's risk tolerance, the sensitivity analysis can also apply a different discount rate[1]

- A higher discount rate means a more risky project
- There is not a general rule for which discount rate to apply to a certain project – though a longer investment horizon generally requires a higher discount rate given the increased risks involved and opportunity costs of tying up capital

A more granular cash flow and sensitivity analysis allows for better tailoring of the financial instrument. It is important to segment SHFs as much as possible, using real income figures

	Sensitivity analysis: Net Present Value on renovation minus BAU after 10 years			
	Discount Rate	5%	**10%**	15%
	Normal	$900.35	**$371.39**	$37.82
Agricultural risks	**Price decreases**			
	10%	$645.71	**$199.92**	($78.44)
	20%	$391.07	**$28.44**	($194.71)
	30%	$136.43	**($143.04)**	($310.97)
	Costs increase			
	10%	$735.75	**$237.05**	($74.66)
	20%	$571.14	**$102.72**	($187.14)
	30%	$406.54	**($31.62)**	($299.62)
	Production shortfall			
	10%	$645.71	**$199.92**	($78.44)
	20%	$391.07	**$28.44**	($194.71)
	30%	$136.43	**($143.04)**	($310.97)

Sensitivity analysis implications:

- **The investment is highly sensitive to price decreases, cost increases, and production shortfalls**. For example, a production shortfall of just 20% over 10 years would decrease the NPV to ~ USD 100, and a production shortfall of 30% makes it a negative investment
- **If lenders require a higher discount rate than 10% then the investment quickly becomes unviable at even 10% prices decreases**, cost increases, and/or production shortfalls
- Essentially, this entails that while renovation investment in isolation is preferable to a 'do nothing' scenario, it can easily be a worse investment than 'do nothing' if one of the above changes occur

Notes: (1). The discount rate is the interest rate used in discounted cash flow (DCF) analysis to determine the present value of future cash flows. The discount rate in DCF analysis takes into account not just the time value of money, but also the risk or uncertainty of future cash flows; the greater the uncertainty of future cash flows, the higher the discount rate. For lenders, the discount rate would also take into account their cost of capital source: Investopedia, *Discount rate,* 2017. Source: Dalberg analysis and interviews

Besides project risks, investors must also understand risks in relation to farmer segments, which generally increase as you move down the pyramid

Agricultural risks for different farmer segments and their impact on lender risks and costs

	Agricultural risks			Lender risks[1] and costs	
	Production: Typically increase as you move down the pyramid because farmers make use of worse practices and have less access to inputs	**Enabling environment:** Some country level policy elements (e.g. taxes) impact all farmers similarly, but the stronger more connected farmers will typically be better suited to adopt to changes and opportunities in the enabling environment	**Market:** Are generally high for all farmers, but some of the strongest farmers will have offtake agreements	**Credit risks:** Increasing exposure to agricultural risks entail that farmers are increasingly unable to pay back loans as you move down the pyramid (and will also have less/no collateral to offer as guarantee).	**Operational costs:** Transaction costs increase disproportionately as you move down, with less information for due diligences, smaller ticket sizes, fewer capable intermediaries (e.g. coops) etc.
Large and medium farmers	Low	Low	Medium	Low	Low
SHFs in tight value chains	Medium	Medium	High	Medium	Medium
SHFs in loose value chains	High	High	High	High	High
Disconnected SHFs	High	High	High	High	High

Level of risk/cost

Low | Medium | High

It becomes costlier and costlier to make loans viable as you move down the pyramid – even if the R&R cash flow analysis indicates the project could be bankable

Notes: (1) We have not considered other lender risks such as liquidity risks. Source: Dalberg analysis and interviews

The risks – if identified and assessed – can be mitigated through a range of tools to try and support the bankability of R&R projects (1/2)

Agricultural risk	De-risking tools and their requirements	Case study examples[1]
Production risks	• **Tools:** TA is the primary tool to decrease production risks by increasing the use of GAP • **Requirements:** Grants to finance TA; high quality extension service or farmer organizations to deliver training; ability and willingness to visit and revisit farmers over time for M&E • **Cost:** Increases significantly as you target smaller and more disconnected farmers that have less preexisting knowledge and are harder to serve	The Technoserve TA program in East Africa uses the innovative farmer field schools approach which decreases the cost of TA by training to farmers to be trainers themselves (case study 6)
Enabling environment risks	• **Tools:** Government support for R&R – e.g. subsidies, loans or public agencies that deliver part of the R&R package (e.g. seedlings); decrease in taxes on inputs (e.g. fertilizers) • **Requirements:** Significant political commitment to support R&R • **Cost:** Depends on the specific government program	The Mexican government deploys 400 agronomists in different regions The Colombian government covered 40% of the loan principal (case study 4)
Market risks	• **Tools:** Offtake agreements; price floors and premiums; future contracts (a contract that buy or sell a particular commodity or financial instrument at a predetermined price at a specified time in the future) • **Requirements:** Willingness from buyers to commit to a certain supply base (and price) • **Cost:** Costs depend on price offered to farmers, but can potentially be recouped by higher onward sales prices if quality of coffee is high	Starbucks offers Nicaraguan farmers a long-term offtake agreement with a competitive price compared to actual prices (case study 1)

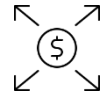
Notes: (1) See further examples in the case studies in Section 3 and in the annex. Source: Dalberg interviews

The risks – if identified and assessed – can be mitigated through a range of tools to try and support the bankability of R&R projects (2/2)

Lender risks/costs	De-risking tools and their requirements	Case study examples[1]
Credit risks	• **Tools:** First loss guarantees; collective collateral from SHF orgs.; payment triangulation with coffee buyers; (for some, granular farmer segmentation and diversification)[2]; farm level monitoring (especially during first years of intervention, collateral registration • **Requirements:** Availability of providers with higher risk appetite and right capital structure; detailed information about individual farmers; SHF organizations with collateral; (for some, a diverse set of farmer profiles)[2] • **Cost:** Vary significantly – costs are typically born by providers of motivated capital, or donors e.g. USAID DCA	Root Capital relies on local coops to on-lend loans to farmers to decrease credit risks, while having significant ticket size, collective collateral and monitoring of farmers (case study 2) ECOM relies on its close relationship with farmers in Nicaragua to deploy highly tailored loan products (case study 1)
Operational costs	• **Tools:** Partnerships with local organizations with prior experience offering long-term finance, or working with the specific farmers in mind; innovative technologies (e.g. mobile money based lending and monitoring models) to reduce transaction costs; partners • **Requirements:** Availability of technology and local partners • **Cost:** Can be high if technologies need to be developed and implemented, or if there are no local partners to rely on	

Notes: (1) See further examples in the case studies in Section 3 and in the annex. (2) Some finance providers use a diverse set of farmers to de-risk their loans (e.g. by bundling bigger, more creditworthy, farmers with smaller more risky farmers. However, this tactic can also increase risks for an individual loan as it would require differentiated credit and TA within the same loan (though it might mitigate risks at portfolio-level). Source: Dalberg interviews

At current, the high levels of risk, uncertainty over that risk, and high operational costs mean most financing remains through grants



The cost of lending

- The process of lending is much more expensive than giving away grants. It requires a due diligence on farmer creditworthiness, sometimes complicated legal/financial structures at the project level, de-risking tools which may have costs themselves e.g. TA or a future contract, monitoring of the farmer post disbursement, and sometimes processes to restructure non-performing loans, or recover resources in the case of defaults.
- These costs generally increase disproportionately to the potential returns as you get to poorer farmers (though these have the greatest need for support with R&R, and the greatest potential gains).
- However, the lender cannot just add these costs into the price of the loan (so the investor can recoup the payment and still make the desired return). This would make the loans unaffordable and entail that SHFs are unwilling to take the loans.

Agriculture is inherently risky, and SHF agriculture especially so, and the limited track record of financing R&R means that transaction costs are still high:

- The uncertainty around the risk associated with R&R is high, as few projects have generated data. As such, it is very hard to accurately price in the right risks for a weakly connected famer in Tanzania, or a cooperative member in Honduras
- Furthermore, the transaction costs for designing and delivering projects are high (see above), and the razor thin margins for coffee farmers mean these cannot simply be priced in to the lending

Which entails that grants will continue to play a financing role for the foreseeable future:

- The high risks and limited track record mean that those lending for SHF R&R are all impact focused lenders (rather than those solely focused on maximising profit), and they are lending relatively small volumes of capital, and/or mostly lending to the stronger/better connected SHFs
- Over time, confidence in understanding the risk will increase, and innovations in project design e.g. blended finance – see next slide - will bring down costs and increase risk mitigation capabilities
- However, for the foreseeable future, there will remain a large role for grants in directly funding SHF R&R in coffee

‘Blended finance’ models for R&R should be expanded to ‘crowd in’ more commercial investors that are looking for market, or near-market return

Grants should not just be used for direct R&R funding, but also to crowd in commercial capital via blended finance

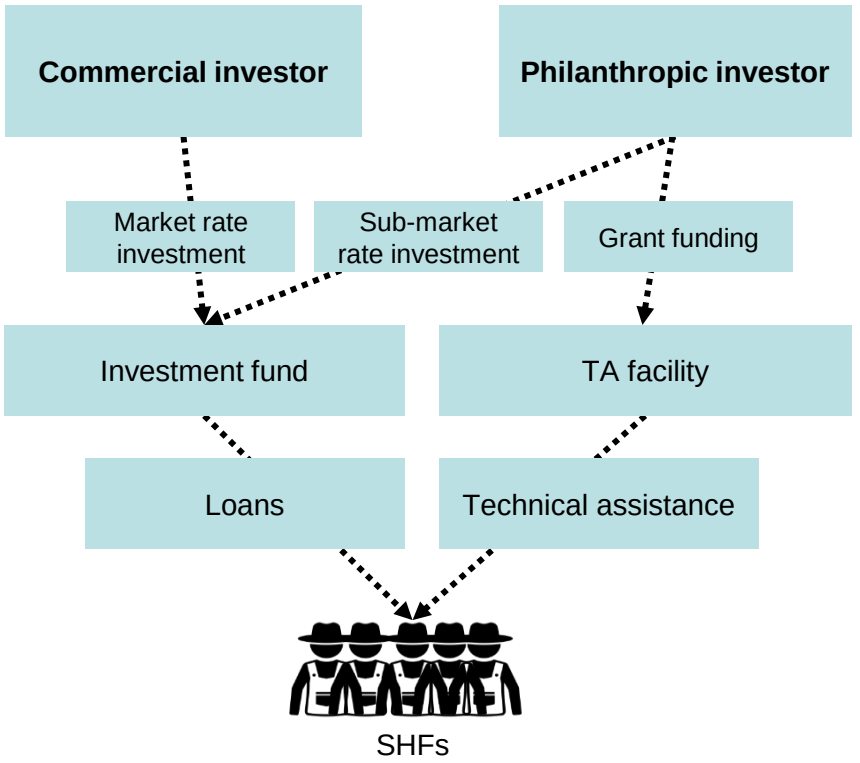
Grant-only funding will not be sustainable in the long run:

- Only funding R&R through grants will not be sustainable as the R&R investment cycle will require continuous investments (e.g. for each rehabilitation or renovation cycle)
- As such, grants do not only have a role to play to bring farmers over the “hump” of renovation needs, but also to de-risk R&R investments in total, and thereby attract more commercial return-seeking capital

By crowding in commercial capital, investors can expand blended finance models to help overcome the gap:

- *“Blended finance investments are made by a mix of public, private, and/or philanthropic investors in an enterprise, and can take the form of either equity or debt. The mix of priorities among investors allows blended finance to provide better terms to enterprises that are creating social impact, while still “crowding in” commercial investors that are looking for market or near-market returns”*[1]
- There are already innovations being made in the R&R sector (see case studies) which should be expanded upon

Conceptual overview of a blended finance R&R model[1]

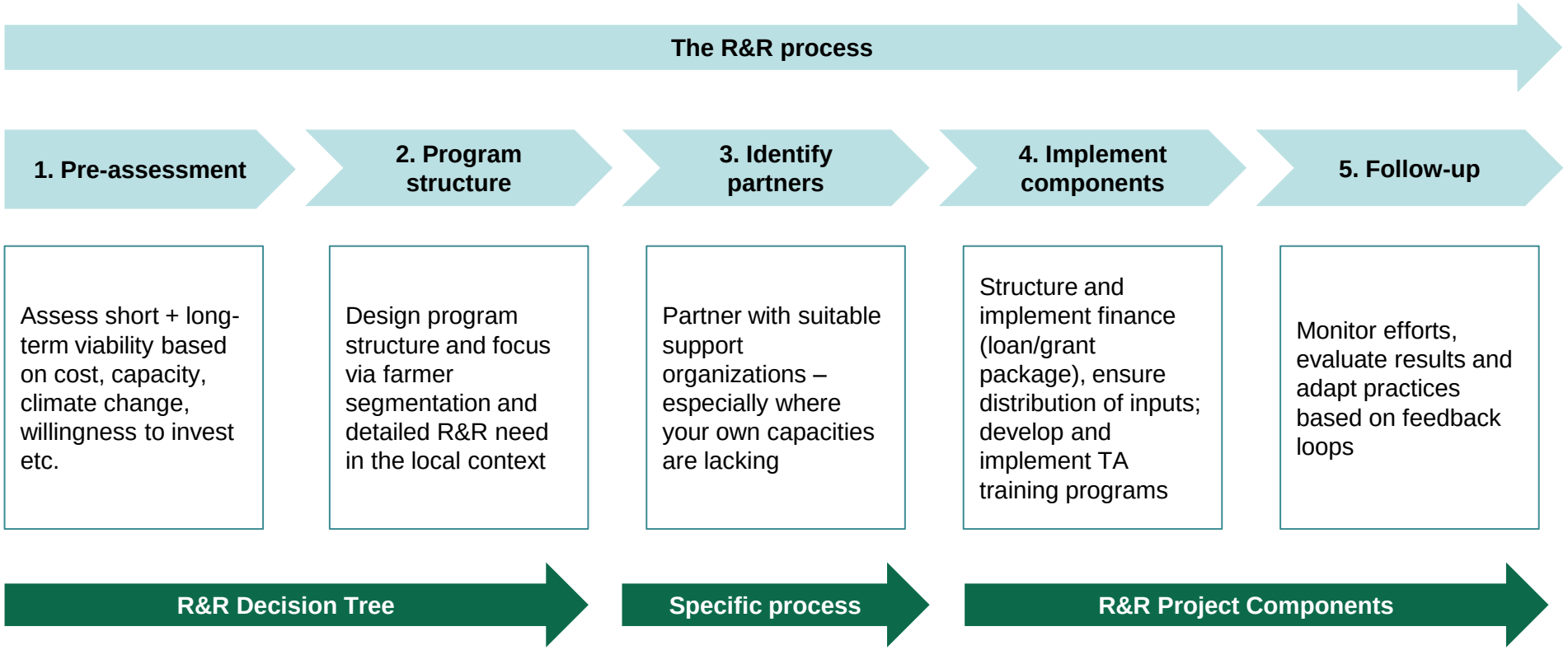


NCBA CLUSA recently partnered with Banco Hipotecario, one of the largest mortgage banks in El Salvador, to create a **blended finance facility** to deliver long-term credit to SHFs. Banco Hipotecario will offer financial products backed by a Guarantee Fund provided by NCBA CLUSA through the USDA Coffee Rehabilitation and Agricultural Diversification Project. The fund, totaling only USD 325,000, will reduce risk for the bank and support farmers' access to loans totaling USD 6.5 million for the coffee sector. With a small guarantee, financial access is multiplied.

Notes: (1): C/Can 2025 and Dalberg, *Financing Sustainable City Cancer Treatment Infrastructure Report* , 2016

Sources: NCBA CLUSA, http://www.ncba.coop/ncba-international/1573-partnership-with-local-el-salvador-bank-to-bring-in-over-6-million-in-loans-to-struggling-coffee-sector, 2017; Dalberg analysis

Summary of section 3 - How to make R&R work: There are five key steps to successful R&R



Contents

There are seven major needs for the R&R sector, from scaling up existing approaches to programming, to laying the foundations for future R&R

Expand current programming models.
Current programs work well at reaching certain types of SHFs and with 90% of the R&R need unmet, there is a clear and important need to scale up existing programs

Fill data gaps on R&R need, and farmer segmentation
Data on R&R need is scarce globally, often based on expert estimates of how many SHFs there are, and what their links to markets are. Implementers must share lessons learned more widely

Innovate in delivery to dramatically reduce costs
R&R costs vary significantly across countries, but will need to be dramatically reduced for R&R to become feasible for farmers at the 'bottom of the pyramid':

- This includes re-thinking how inputs are delivered
- And exploring lower cost ways of delivering the technical assistance at scale

Innovate in finance to leverage commercial capital, and to reach farmers further down the pyramid

- Blended finance models are needed to bring in commercial capital – essential for scale
- Innovations in de-risking lending are needed for the sector to provide returnable capital to farmers who are now only reached through grants

Better understand possible rehabilitation outcomes
The choice between renovation and rehabilitation is not always clear, but renovation has received the majority of the attention, with more projects/investment, and more data on outcomes. Rehabilitation has lower costs and risks, and the sector should seek to better understand what outcomes can be driven through rehabilitation and how often this is 'enough'.

Build R&R support systems by strengthening coops, nurseries, local banks, research institutes etc.
For many countries, the constellation of actors needed for successful R&R is not present and/or capable. These longer term, system-building investments are not glamorous, and hard to justify for value chain partners, but they are nonetheless essential for future R&R efforts

Join others in advocating to governments for the value of R&R
And for best practice in delivering R&R. Governments' budgets and inclusive focus mean their R&R investments can target those farmers that others struggle to reach

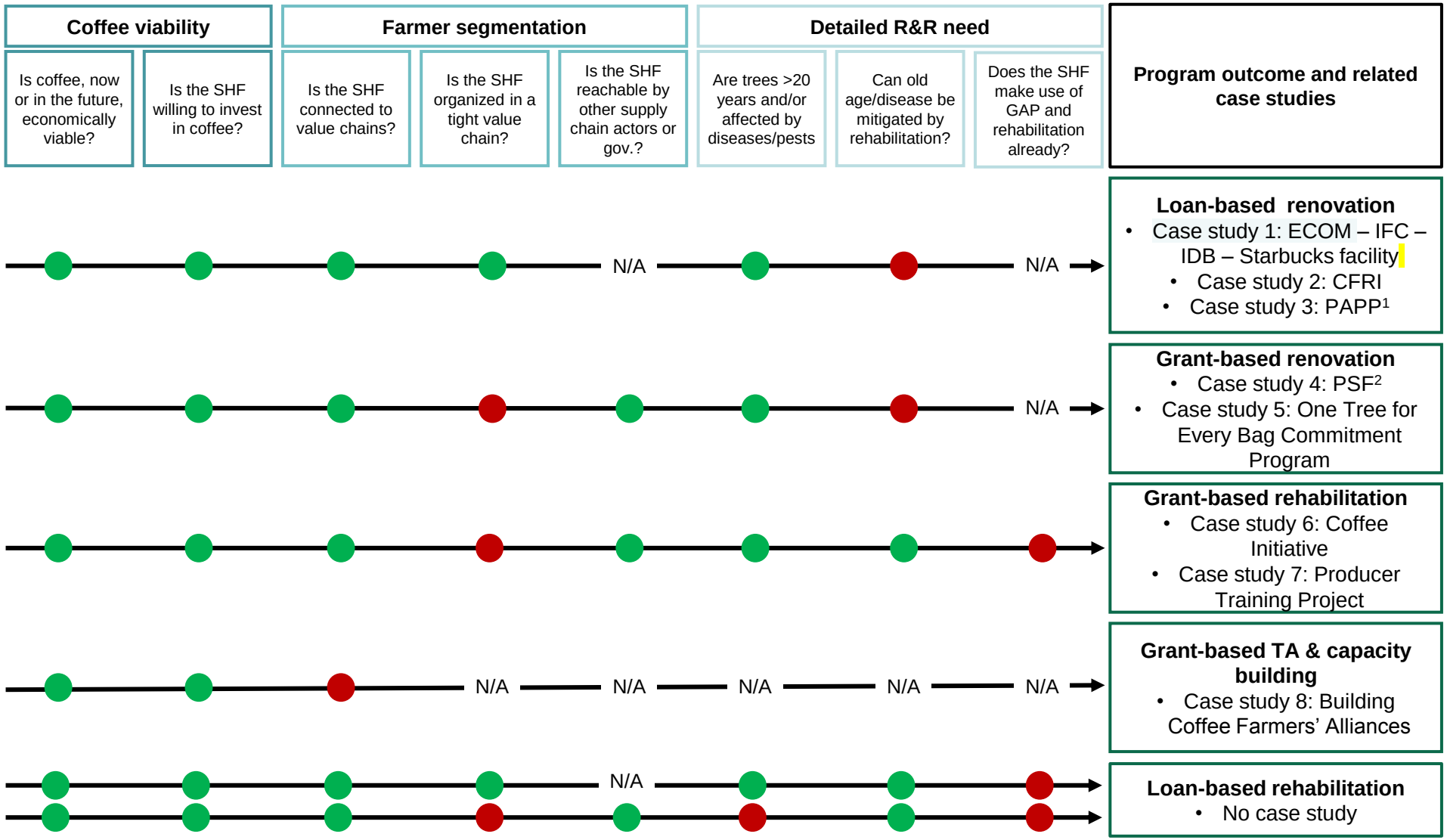
For some combinations of actor and need, the business case is clear: the text boxes below represent great places to start

Areas for increased R&R action – by type of actor and R&R need

R&R need	Roaster/trader/ retailer	Financial institution	Donor	SHF support organization/ NGO	R&D Center/ University	Government
	Clear need to expand programming using existing models – almost always in partnership Should use decision tree-type analysis to target programming					Yes – where coffee is a key part of the economy
	Scale up sharing of lessons learned and data from programs for the benefit of entire sector				Continue to do research and experimentation	
	Larger players could devote some resources to experimental programming		Ability to focus on non-financial definitions of success is a strength here			
		Key role here, for donors, DFIs, social lenders, and local banks to innovate in financing structures				
	Should use decision tree analysis to understand where rehabilitation might be the right choice				Do more research on benefits on rehabilitation over renovation	
	Relevant for larger actors who can justify programming without tangible benefits back to the business		Focus on public goods that is not always feasible for the private sector	Relevant where there are specialist skills e.g. cooperative strengthening		Focus on public goods that is not always feasible for the private sector
	Significant opportunity – governments are the biggest investors in R&R and can reach the whole pyramid: catalyzing government action would be excellent leverage on others actors' resources					

Contents

Overview of Section 5: This section includes eight deep-dive case studies that each link to a particular program outcome in the R&R decision tree



(1) The PAPP program targets disconnected SHFs or SHFs in loose value chains. Loans provided are highly concessional. (2)The PSF program both has grant and loan components.

Case study 1: ECOM's close relationship with Nicaraguan farmers has been used to setup a direct and innovative renovation financing mechanism (1/2)

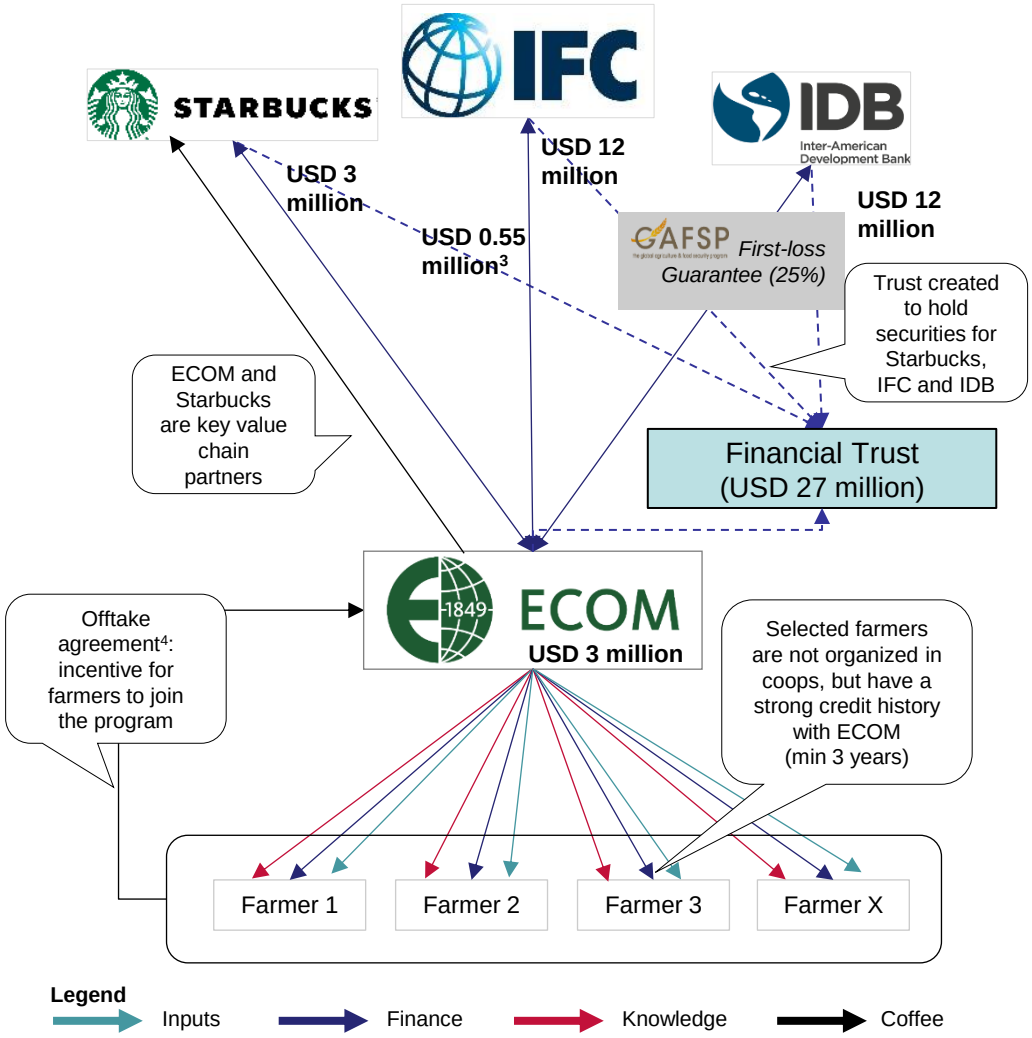
ECOM – IFC – IDB – Starbucks facility

R&R type	Loan-based renovation
Country	Nicaragua
Cost	USD 30 million
Dates	2011 – 2025
Project context	• In 2013, *La Roya* affected 40% of coffee plantations in Nicaragua creating the need for a large renovation program. • The coffee sector is loosely regulated. Private traders[2] have a strong presence in the country and have tight relations with farmers in their supply chain.
Objectives, activities, and results	• The program aims to renovate up to 5,000 hectares (~5% of total coffee area in Nicaragua) via loans to ~550 farmers. • The target is to renovate 1/3 of farmers' land. • It is still too early to estimate final yield uplifts, but preliminary results look promising. • Value creation: Improved planting material with certified plants that are tolerant to rust and improved quality attributesand; improved livelihoods • Value capture: ECOM and Starbucks secure supply; SHFs through increased incomes

Loan details

Borrowers	Farmers with an ECOM credit history
Currency	USD
Tenor	Up to 8 years
Grace period	3 years (interest only)
Interest rate	Affordable in the one to two digit range and depending on the credit profile of the farmer

Figure 1: Structure of the project



Notes 1) IFC mobilized project partners IDB, Starbucks and ECOM to design and set up the program, (2) ECOM, Mercon, and OLAM trade 90% of Nicaragua's coffee; (3) In parallel with IDB's loan for this project, a grant from the IDB's Multilateral Investment Fund (MIF) is planned as part of a technical assistance package totaling USD 546,305. The package aims at supporting the management of ECOM's portfolio of credits to small producers. (4) Starbucks committed to buy coffee guaranteeing a minimum price providing protection to farmers. Source: IDB, '*IDB partners with IFC, Exportadora Atlantic and Starbucks to help Nicaraguan farmers combat coffee rust disease*', Press release 06/24/14; Dalberg interviews.

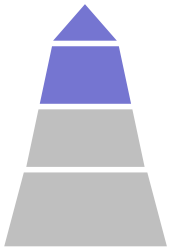
Case study 1: ECOM's close relationship with Nicaraguan farmers has been used to setup a direct and innovative renovation financing mechanism (2/2)

Project context

Viability

- **Viability:** Productivity is low: potential for a 64% yield improvement if GAP, rehabilitation, and renovation are applied[1].
- **Willingness:** ECOM knows individual farmers and is able to evaluate their willingness to invest in certified plants, adopt improved practices, and ability to repay loans

Farmer segmentation



- **Country situation:** 95% of farmers in Nicaragua are SHFs. Farmers are typically not organized into coops, but private traders have strong relations with farmers (tight value chain).
- **Program segmentation:** Loans were first given to larger farmers, then to smaller farmers (<12ha). All farmers have a strong credit history with ECOM.

R&R need

- **Country need:** 60% of trees are estimated to be over 20 years old in Nicaragua, and 40% of trees were affected by *La Roya* in 2011
- **Program objectives:** The program aims to renovate 5,000 hectares. This is a pilot program that could be replicated in other countries (Mexico, Costa Rica and Colombia) if a suitable partnership structure can be found.

Management of the three R&R components

Inputs

- **Providers:** Nicaragua has good local capacity in seed production. In 2011, CIRAD[2] was developing a pilot project to select rust tolerant coffee varieties with high cup quality characteristics
- **Challenges faced:** The choice of appropriate varieties is key to the success of the program, but registering new varieties (e.g. *Marsellesa*) took time.
- **Solution:** Build up local capacity to produce certified plants

Finance

- **Providers:** IFC, IDB, ECOM and Starbucks
- **Challenges faced:**
  - Understanding risk
  - Diversifying risk
  - Protecting investors
- **Solutions:**
  - ECOM data supported underwriting, but loans to date had been for 3-5yr working capital, not long term infrastructure loans, so there was high uncertainty
  - Involvement of larger farmers de-risked the portfolio of loans
  - The investors set up a trust, which while time consuming, has protected them from exposure if loans do default

Knowledge

- **Providers:** ECOM and IFC
- **Challenges faced: I**mproved planting varieties require use of inputs and adoption of GAP
- **Solution:** IFC will work with ECOM's field agronomists to standardize skills and knowledge of improved practices which will help to increase adoption rates from participating farmers

Lessons learned

- **Farmer segmentation is crucial to success:** Larger farmers were used to diversify the portfolio of loans, and deliver return expectations that met the investors' needs, whilst also ensuring some SHFs can renovate their farms.
- **Close links between traders and farmers mean you can do renovation without a cooperative:** Although Nicaraguan farmers are typically not organized in strong cooperatives, ECOM was able to select appropriate farmers and deliver training because of their close relationships with farmers.
- **Transaction costs for pioneers can be very high:** The coalition of partners faced significant time costs in developing the programme, and delays in negotiating new trust law in Nicaragua.

For more information, please contact: Mariana Petrei, IFC, Senior Investment Officer mpetrei@ifc.org

Note: (1) Figures from GCP and Technoserve, *Economic viability of coffee farming,* 2017. (2) The French agricultural research and international cooperation organization working for the sustainable development of tropical and Mediterranean regions. Source: IDB, '*IDB partners with IFC, Exportadora Atlantic and Starbucks to help Nicaraguan farmers combat coffee rust disease*', Press release 06/24/14; Dalberg interviews.

Case study 2: Long-term loans for renovation are provided by a blended finance facility to farmer organizations in Latin America (1/2)

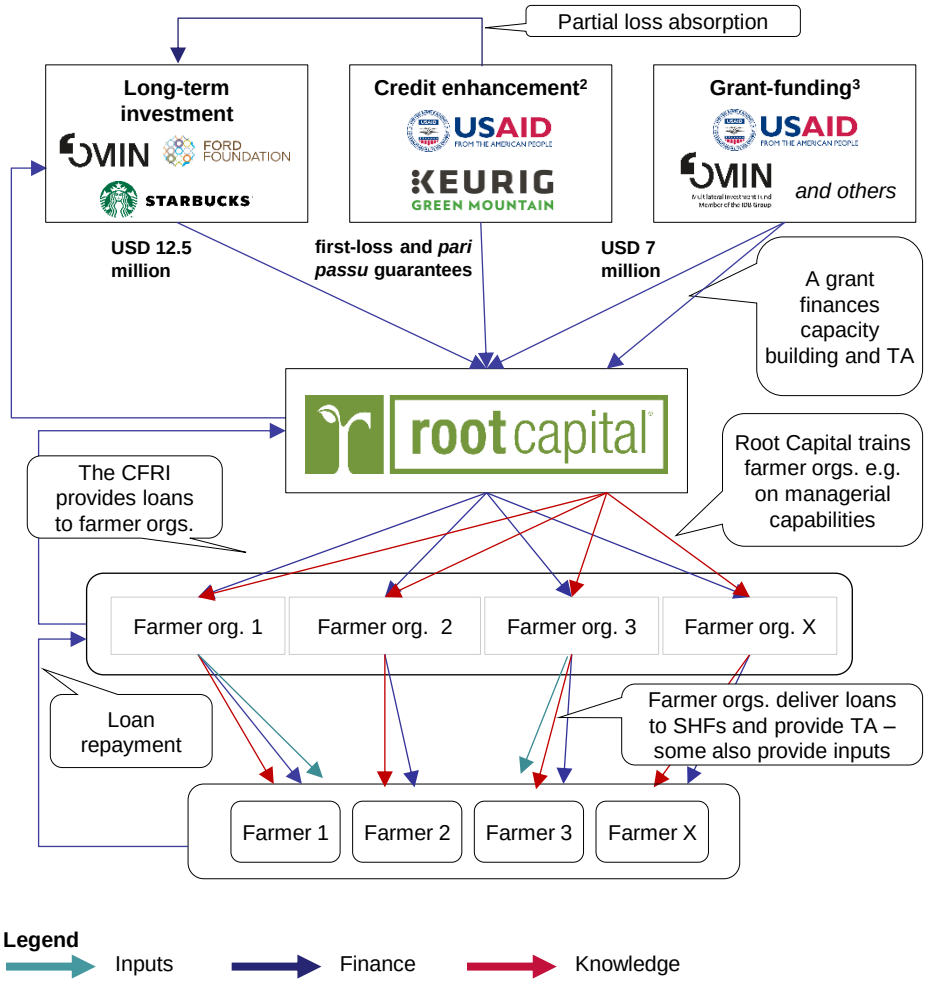
Coffee Farmer Resilience Initiative – *Root Capital*

R&R type	Loan-based renovation
Countries	Honduras, Nicaragua, Peru
Cost	USD 7.7 million in loans approved
Dates	2014 - 2016
Project context	• In 2011/12, *La Roya* affected almost 50% of the total coffee growing areas in Latin America, significantly reducing the SHF production. • *La Roya* outbreak revealed decades of underinvestment in the coffee sector. Over 60% of trees in the region had passed the productivity peak and were more exposed to the disease.
Objectives, activities, and results	• Root Capital provided loans to SHF orgs who then distribute to SHFs to support the upfront cost of R&R. Root Capital also provided technical assistance (free to SHF orgs.) and challenge grants (with cost-share from orgs) to build org. capacity to implement R&R programs. • USD 7.7M in loans were approved to 8 orgs. in Honduras, Nicaragua, and Peru.[1] • Value creation: increased yields and strengthened SHF capacity • Value capture: farmer groups selling higher volumes of coffee

Loan details

Borrowers	Farmer aggregations (e.g. coops)
Currency	USD
Tenor	3-7 years
Grace period	1-3 years
Interest rate	7-10.5 APR

Figure 1: Financial structure of the project and finance delivery to SHFs



Notes: (1) TA and challenge grants were extended to an additional 25+ orgs in El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Peru. (2) Keurig Green Mountain provided a first-loss guarantee of USD 400,000 (~3% of target credit disbursements). USAID provided a 50% *pari passu* guarantee of up to USD 15 million (i.e., USAID absorbs USD 0.50 of the loss for every dollar not repaid by eligible borrowers after the USD 400,000 in first-loss coverage has been used). (3) Specialty coffee roasters Cooperative Coffees, Equal Exchange, and Keurig Green Mountain channelled funding for technical assistance. Other donors (incl. the DOEN Foundation Open Road Alliance, the Multilateral Investment Fund of the IDB Group (FOMIN), the Skoll Foundation, and the Swedish Postcode Foundation, and USAID) provided grant funding to cover cost associated with program design, technical assistance, etc. Source: Root Capital, *Learning Report: The Coffee Farmer Resilience Initiative,* 2016.

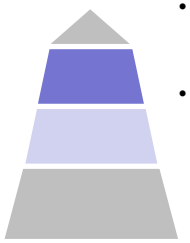
Case study 2: Long-term loans for renovation are provided by a blended finance facility to farmer organizations in Latin America (2/2)

Project context

Coffee viability

- **Relevance**: SHFs in Latin America have potential for yield uplift by applying GAP and R&R (e.g. potential of 31% net income increase from yield improvements in Honduras, 64% in Nicaragua, and possible double of yields in Peru[1]).
- **Willingness:** Farmer public sector (or other farmer organizations) have an intimate understanding of the needs and production capacity of their members and can evaluate their willingness and credit worthiness.

Farmer segmentation



- **Country situation:** In the three countries, coffee producers are SHFs. Their degree of integration within value chains vary by country.
- **Program segmentation:** The program targets SHFs in tight value chains, mostly members of farmer orgs. such as coops or private coffee mills. Some farmers in loose value chains were also targeted via through savings and loan cooperatives where the coops were less strong.

R&R need

- **Country need:** Almost 900,000 ha would benefit from R&R in Nicaragua, Peru, Mexico and Honduras.
- **Program objectives:** Building the capacity of SHF orgs. and farmers to recover from the La Roya outbreak and build resilience for the future through R&R

Management of the three R&R components

Inputs

- **Providers:** Third parties
- **Challenges faced:** SHFs must have access to upfront and ongoing inputs. SHF orgs. must have the capacity to source and deliver appropriate inputs.
- **Solution:** Root Capital only selects SHF orgs. that are able to manage selection and application of adequate farm input. A Root Capital approved agronomist assists SHF orgs. with preparing their input delivery plan for SHFs.

Finance

- **Providers:** Various (cf. previous slide)
- **Challenges faced:** Understanding risk and bringing together funders with aligned risk appetites; protecting investors
- **Solution:**
  - Root Capital conducted intensive due diligence. Selected SHF orgs. must have adequate sources of internal financing to cover at least 20% of the R&R investment. Root Capital also assessed credit risk using in-house tools developed over 15+ years[2].
  - Using a blended finance structure to partially de-risk the investment[3].

Knowledge

- **Providers:** Root Capital
- **Challenges faced:** Most of the farmer groups lack the ability to manage R&R loans for SHFs.
- **Solution**: 35 trainers delivered financial advisory services to managers and accounting staff of Root Capital's potential or existing clients. Training focuses on managerial, organizational, technical capacities, with a focus on orgs' internal credit and technical assistance services

Lessons learned

- **Leveraging blended finance structures enables lenders to partially de-risk R&R investments:** Root Capital used a blended finance structure to align the incentives and risk appetites of the different funders. Mechanisms of partial loan guarantees, risk-sharing, reserves for first-loss capital, and technical assistance funds helped to mitigate risks. These types of blended finance structures should be reproduced to scale R&R financing.
- **Invest in capacity building for aggregation points:** Root Capital relies on farmer organizations to deliver and manage loans to SHFs. Many SHF orgs., however, currently lack the capacity to manage large R&R interventions. Strengthening SHF orgs. or other farmer aggregation points, like local microfinance institutions, is needed to scale R&R.

For more information, please contact: Elizabeth Teague (Root Capital), eteague@rootcapital.org

Notes: (1) Source: GCP and Technoserve, *Economic Viability of Coffee Farming,* 2017. (2) Root Capital assesses the credit risk of borrowers using an internal rating system that weighs various risk categories, including scale and buyer diversification, enterprise strength and growth potential, financial flexibility, and financial strategy. This data is combined with the experience and judgment of loan officers to inform a full assessment of credit risk. (3) The funding comes from public and private financers with different return expectations. Credit enhancements reduce the investment risk, and grant funding dedicated to capacity building reduces the client risk, ultimately reducing the investment risk. Source: Root Capital, *Learning Report: The Coffee Farmer Resilience Initiative,* 2016; Dalberg interviews

Case study 3: A blended finance government program enabled the smallest most disconnected SHFs in Honduras to renovate their land (1/2)

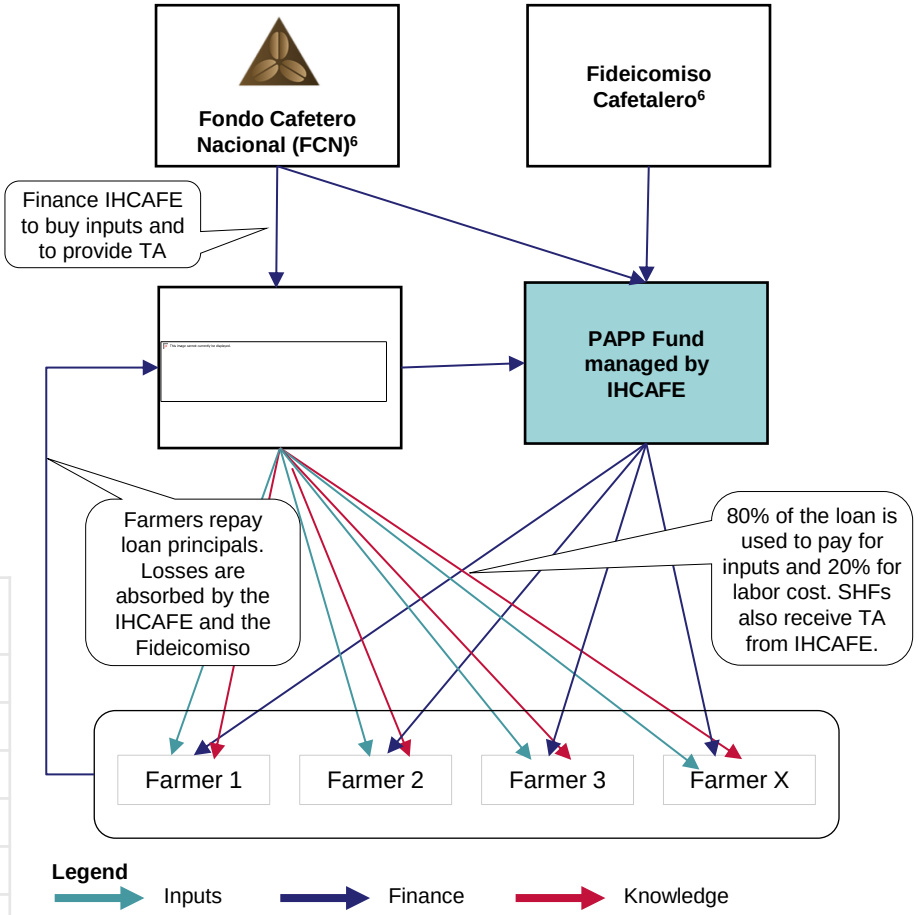
Programa de Apoyo al Pequeno Productor (PAPP) - *IHCAFE*

R&R type	Loan-based renovation
Country	Honduras
Cost	USD 12.5 millions
Dates	2007/08 – present (no set end date)
Project context	• Coffee trees in Honduras have been affected by *La Roya* and about 60% have passed their productivity peak.
Objectives, activities, and results	• The PAPP was created following a government decree on the reactivation of the coffee sector[1]. • The program targets a reduction of the poverty at farmer family level through an increase of revenues from coffee production. The PAPP is a three phased-program. • 22,827 SHFs were reached and 15,500 ha were renovated. • Value creation: increased yields of least productive SHFs and improved livelihoods. • Value capture: the program finances a public good. The value is yet to be captured by the financers.

Loan details

Borrowers	SHFs producing <1.5 tons (phase 1) SHFs producing <3 tons (phase 2-4)[2]
Currency	HLN (Honduran Lempira)
Tenor	6 years
Grace period	3 years
Interest rate	0%[3]
Loan size	USD 540 – USD 860[4]
Default rate	Average 30%[5]

Figure 1: Financial structure of the project and input delivery model



Notes: (1) Decree N.56-2007, *Ley de Reactivacion del Sector cafetalero*. (2) On average, a production below 1.5 tons corresponds to a farm size below 1 ha. (3) Interests are fully subsided by the IHCAFE and the Fideicomiso Cafetalero. (4) HLN 12,500 to HLN 20,000 (5) Default rate were higher during the first phase of the program (42%), 26% during phase 2, and 6% during phase 3. (6) The Fideicomiso Cafetalero are funded through a tax of USD 9.00/quintal of coffee exported. Source: IHCAFE, *Programa de Apoyo al Pequeno Productor*, 2017; IHCAFE, *El sector Café de Honduras: Avances, Institucionalidades y Desafios,* 2017; Dalberg Interviews

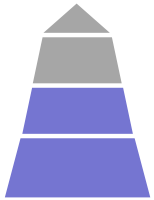
Case study 3: A blended finance government program enabled the smallest most disconnected SHFs in Honduras to renovate their land (2/2)

Project context

Coffee viability

- **Viability:** Honduras has seen an increase in production in the past years, but there is still potential to improve yields by 45%, including through renovation and rehabilitation.
- **Willingness:** SHFs benefitting from the program must have coffee as their main crop and comply with the Code of Conduct of the PAPP.

Farmer segmentation



- **Country situation:** 95% of coffee producers in Honduras are SHFs with less than 7 ha. More than 60% produce less than 1.5 tons of green coffee each year.
- **Program segmentation:** Grants were provided to the least productive SHFs during phase 1 of the program. The program was then expanded to more productive farmers (less than 3 tons/year), who often belong to loose-value chains

R&R need

- **Country situation:** Honduras was seriously affected by *La Roya.* About 187,000 ha (more than 70%) of the coffee trees would benefit from renovation or rehabilitation.
- **Program objectives:** The program enabled the renovation of 15,500 ha among the poorest and least productive farmers.

Management of the three R&R components

Inputs

- **Providers:** IHCAFE
- **Challenges faced:** SHFs need renovation package including upfront inputs (seedlings and fertilizers) and ongoing inputs (fertilizers).
- **Solution:** 80% of the loan value is used to pay IHCAFE for inputs (seedlings and fertilizers). IHCAFE recommends varieties produced by local institutions and distributes them to farmers. The remaining 20% are used to pay for labor costs.

Finance

- **Providers:** Fideicomiso Cafetalero.
- **Challenges faced:** The PAPP serves the farmers with the lowest financial capacity. Default rate averages 30%, .
- **Solution:** Loans are highly concessional. The Fideicomiso-IHCAFE absorbs financial losses. The PAPP tries to improve its recovery rate. It is currently implementing a study[1] to segment defaulting farmers, to understand causes of default and to design adaptation strategies.

Knowledge

- **Providers:** IHCAFE agencies[2]
- **Challenges faced:** The least productive SHFs have the highest TA needs. The cost of TA is higher for the bottom of the pyramid.
- **Solution:** IHCAFE delivers TA to farmers through individual or group training. The PAPP wants to develop a differentiated Technical Assistance and Capacitation plan to better understand the personalized needs of farmers.

Lessons learned

- **Reaching SHFs at the bottom of the pyramid requires a specific program design that cannot be made on a commercial basis:** SHFs reached by the PAPP have low or no connection to the market and have a low capacity to repay their loan. A program targeting this category cannot reach commercial viability. It should aim at creating positive social and economic impact.
- **Technical assistance for these beneficiaries should be intensive and designed:** Providing TA to SHFs at the bottom of the pyramid is costly. Understanding precisely their needs and how to best answer them is crucial to reduce the costs of the project and to ensure a successful implementation.

For more information, please contact: Nelson Omar Funez, IHCAFE, *nofunez@ihcafe.hn*

Note: (1) The study is supported by Nestle. (2) IHCAFE is covering Honduran territory through a network of 7 regional agencies, 50 extension services agencies with 100 technical officers and 60 para-technical officers and 8 forest engineers.

Case study 4: A strong government commitment and well-organized coffee institutions in Colombia enabled a successful national renovation program (1/2)

Permanency Sustainability and Future (PSF) – *FNC and Colombian Gov.*

R&R type	Loan-based / grant-based renovation
Country	Colombia
Cost	Approx. USD 600 million
Dates	2008 - 2014
Project context	• In 1998, the government implemented the Competitiveness Program (CP), with the objective of maintaining competitiveness in densely cultivated coffee growing areas. • Between 2008 and 2009, coffee production in Colombia decreased by 32% due to ageing trees and disease.
Objectives, activities, and results	• In 2007/08, the National Federacion of Coffee Producers (FNC) and the Government of Colombia implemented the PSFto enable access to credit for SHFs for coffee renovation. • Objective: renovate 300,000 hectares in 5 years under the PSF and the Competitiveness programs. • Between 2008 and 2014, the PSF provided 216,312 loans to SHFs, enabling the renovation of 184,000 hectares. • Value creation: increased yields of least productive SHFs and improved livelihoods • Value capture: FNC increases coffee exports, and Fondo Nacional del Café (FoNC)[1] increase revenues

Loan and grant details

Borrowers	SHFs with land between 0.2 - 1.5 ha
Currency	COP (Colombian Pesos)
Tenor	7 years
Grace period	2 years (interest paid by the FoNC[1])
Interest rate	Av. 10%
Guarantee[3]	100% guarantee
Grant	Grant covering 40% of the principal

Figure 1: Financial structure of the PSF project

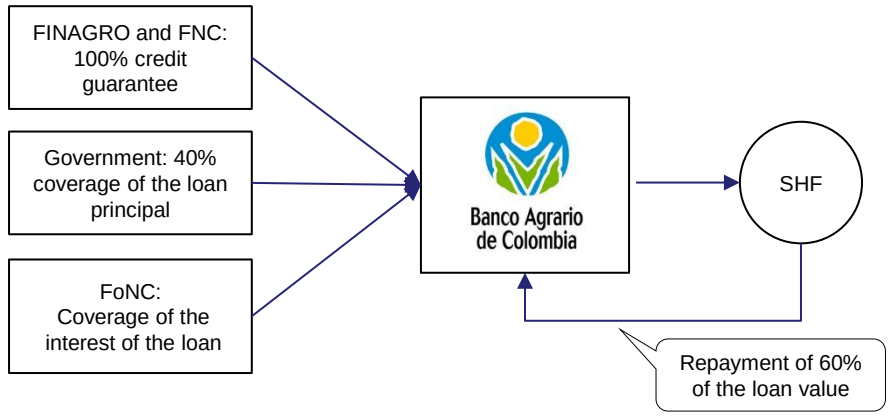
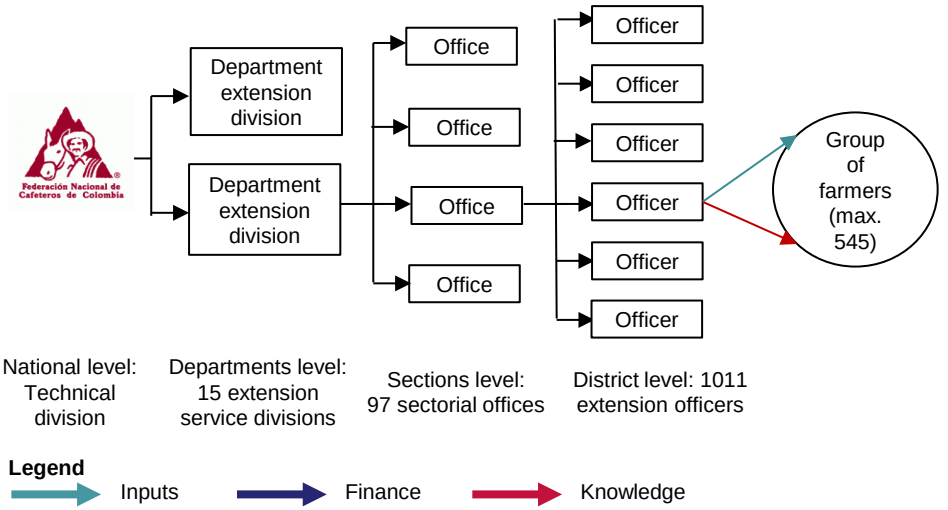


Figure 2: Extension service and inputs delivery model: decentralized model



Notes: (1) The FoNC is financed through a tax of USD 0.6 / lb coffee exported. (2) In 2012, the Fondo Nacional del Café (FoNC) stopped covering loan interest. (3) Guarantees are provided by the National Guarantee Fund (managed by FINAGRO) and the National Coffee Guarantee Fund (managed by the FNC). (4) Rural Capitalization Incentive (ICR). Sources: *Evaluación de impacto de los programas de renovación de cafetales 2007-2011*, Santiago Silva Restrepo; *Renovation and Rehabilitaiton of crop tres in cocao, coffee, palm oil,* Rabo Bank – *Risk and Finance in the Coffee Sector*, The World Bank, February 2015.

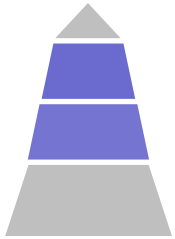
Case study 4: A strong government commitment and well-organized coffee institutions in Colombia enabled a successful national renovation program (2/2)

Project context

Coffee viability

- **Viability:** The 32% drop in production in 2009 reveals a potential for production uplift by applying targeted renovation.
- **Willingness:** Farmers in Colombia are often conscious of the benefits of renovation, and many undertook renovation without any program support. In 2011, 40% of farm renovations were private farmer initiatives.

Farmer segmentation



- **Country situation:** There are more than 560,000 coffee farmers in Colombia, of which over 95% are SHFs. The FNC has a network of 34 coops and 530 trading stations that enables an access to market for most of the farmers.
- **Program segmentation:** The program targets farmers with land between 0.2-1.5 ha, connected to the market by at least a trading station.

R&R need

- **Country need:** The FNC estimated in 2007 that 300,000 ha of land should be renovated over a period of 5 years (60,000 ha/year).
- **Program objectives:** Part of this objective is achieved through the PSF (184.000 ha renovated in 5 years, close to 25% of the total coffee land harvested).

Management of the three R&R components

Inputs

- **Providers:** FNC is in charge of providing seedlings to farmers.
- **Challenges faced:** Planting unverified seedlings may lead to high mortality rates of the trees.
- **Solution:** FNC provides a full R&R package to SHFs, including planting material (certified seeds and seedlings) and agronomic advice on how to plant them.

Finance

- **Providers:** The program was funded by public sources and local financial institutions[1].
- **Challenges faced:** Farmers face a negative cash flow period after replanting ('valley of death').
- **Solution:** Farmers received loans with grant component funded by the government (ICR[2]) that allowed them to bridge the 'valley of death' and to overcome prolonged periods of lower revenues. As a result of this successful financial design, only 7-8% of the loans are in arrears.

Knowledge

- **Providers:** The FNC provided agronomic and business advice to farmers, mostly government-funded[3].
- **Challenges faced:** The large numbers of farmers targeted are geographically spread and belong to loose value chains.
- **Solution:** The FNC implemented a decentralized model to provide TA. It relied on 15 extension divisions at department level and on 97 sectorial offices and a total of 1011 extension officers at district level, who delivered over 6 million of groups or individual interventions between 2010 and 2014.

Lessons learned

- **Long-term political commitment and coordination is crucial to the success of large scale renovation programs:** The PSF program required a long-term commitment and level of coordination between the government, coffee institutions and financial institutions. This model could hardly be replicated in countries with a less organized coffee sector.
- **An important presence in the field is required:** Each extension officer had a maximum of 550 farmers under his supervision, allowing for groups or individual interventions, especially at early stages of the program, and thus increasing adoption of best practices and survival rates of plants.
- **The grace period and the loan component are critical to increase farmer willingness and ability to undertake renovation:** As farmers were provided grants funded by the government, they were willing to undertake renovation of their land and mostly able to reimburse their loans after the grace period (60% of the loan to pay back).

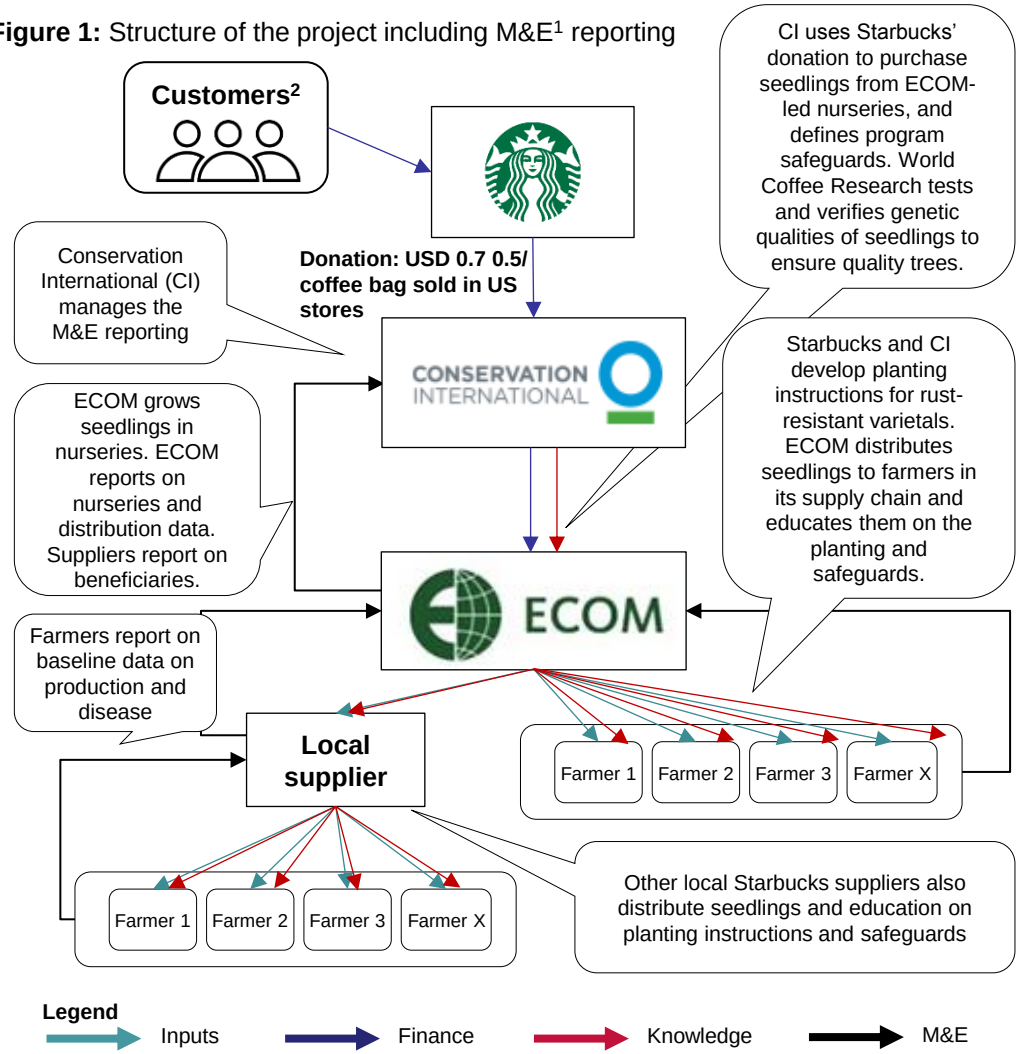
Notes: (1) Funders include the Colombian Ministry of Agriculture, Finagro, Banco Agrario, Banco de Bogotá, Banco Divivienda, the National Coffee Fund (FoNC) and Cundinamarca and Cauca Governors. (2) *Incentivo a la Capitalización Rural.* Between 2010 and 2014, the government disbursed USD 359 million in grant funding. 3: The Colombian Government spent USD 97 million for extension services between 2010 and 2014. Source: FNC, *Sostenibilidad en Accion,* 2013; *Risk and Finance in the Coffee Sector*, The World Bank, February 2015, Rabo Bank and ISH, *Rehabilitation & Renovation of crop trees in cocoa, coffee, palm oil*, 2015.

Case study 5: Starbucks and Conservation International lead a grant-based renovation project with a strong environmental component and innovative consumer connection (1/2)

One Tree for Every Bag Commitment Program (1T1B) - *Starbucks*

R&R type	Grant-based renovation
Countries	Mexico, El Salvador, Guatemala
Cost	Total cost: $19.5 million – USD 0.7 0.5/coffee bag sold
Dates	2015 – 2017
Project context	• In 2011/12, *La Roya* affected almost 50% of the total coffee growing area in Mexico and Central America, significantly reducing the SHF production. • Starbucks launched the "One Tree for Every Bag Commitment" initiative to help ensure the long term supply of coffee and the economic future of farmers. Farmers supported are C.A.F.E. Practice verified
Objectives, activities, and results	• Starbucks raised funds through consumers to finance the distribution of nearly 30 million rust-resistant trees in 2017 and extended commitment to 100 million trees by 2025 (with a focus on Mexico, El Salvador, and Guatemala and as part of Starbucks' green buying program) • Starbucks aims to ensure that 10 million trees are available per year to farmers in need (in the same three countries) • It is still too early to evaluate yield uplifts, but preliminary socioeconomic and environmental results look promising.… • Expected value created: yield improvements and greater livelihood security, forest and shading trees preserved, job creation • Value captured: Farmers are not required to sell their production to ECOM or to local suppliers. Starbucks may recoup part of its investment through increased production volumes, but the program mostly finances a public good.

Figure 1: Structure of the project including M&E[1] reporting



Notes: (1) Monitoring and Evaluation. (2) Since its inception, the program has been funded through customer sales in Starbucks stores. Going forward, Starbucks is integrating the purchase of healthy, rust-resistant coffee trees into its green coffee buying program. By working with long-term suppliers, the company will seamlessly ensure that a total of 10 million coffee tree seedlings per year are available to farmers in need. Sources: Sustainable Coffee Challenge, *The Opportunity for Renovation at Scale – Meeting the needs of 1B+ new trees to restore productivity and sustain supply chain,* 2017; Dalberg interviews

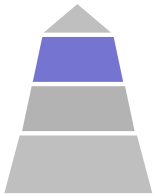
Case study 5: Starbucks and Conservation International lead a grant-based renovation project with a strong environmental component and innovative consumer connection (2/2)

Project context

Viability

- **Relevance**: SHFs in Central America and Mexico have the potential to increase yields by applying GAP and R&R. In addition, R&R can help build adaptive capacity by supporting disease resistance and adaptation to climate change.
- **Willingness:** Farmers in the program must adopt "Safeguards". One safeguard concerns the "right of growers": it acknowledges that the decision to renovate a portion of their land was made freely by the farmer him/herself.

Farmer segmentation



- **Country situation:** In the three countries, SHFs represent the bulk of coffee farmers. Their degree of integration within value chains varies by country, though most are in tight value chains.
- **Program segmentation:** ECOM, or local suppliers, select farmers from their supply chain. A tight link between farmers and suppliers prevents farmers from reselling the distributed seedlings.

R&R need

- **Country need:** Roughly 75,000 ha cultivated by SHFs would benefit from R&R in Mexico, El Salvador, and Guatemala.
- **Program objectives:** Starbucks raised funds to distribute nearly 30 million new trees. ECOM and local suppliers communicate farmers' R&R needs, and CI monitors the tree distribution based on a needs analysis.

Management of the three R&R components

Inputs

- **Providers:** ECOM
- **Challenges faced:**
  - Production of rust-resistant seedlings.
  - Physical distribution of seedlings and tracking of plants once distributed in remote areas may be difficult.
- **Solution:**
  - ECOM germinates seedlings in 12 local nurseries. The seeds produced are rust-resistant (variety *Marsellesa)* and the quality is monitored.
  - Starbucks is planning to support decentralized nurseries to ease distribution, but control of decentralized nurseries is more difficult.

Finance

- **Providers:** Starbucks is financing the seedlings and currently exploring other loan and financial assistance mechanisms.

Knowledge

- **Providers:** Conservation International (CI)
- **Challenges faced:** Farmers may use environmentally damaging agricultural practices.
- **Solution**: CI establishes "safeguards" concerning forest conservation and shade management. Local suppliers teach farmers to respect these safeguards that are in accordance with C.A.F.E. Practices. Local suppliers also provide technical assistance and education on GAP for the planted variety to SHFs. CI visits a sample of farms annually to ensure. safeguards were respected. CI also works closely with Starbucks agronomists to produce detailed planting instructions for farmers to nurture plants in years 1-3.

Lessons learned

- **M&E is critical to ensure renovation implementation success –** A well rounded monitoring system helps ensure that quality trees are being provided, beneficiaries respect environmental safeguards and that the program management, distribution and reach improves year over year.
- **Collaboration and communication between stakeholders enables the successful delivery of diverse project components** – Given the scale of the 1T1B program, in order to ensure timely germination of seedlings and to coordinate mass deliveries, Starbucks, CI and all suppliers needed to maintain close coordination, which included the use of standardized data tracking templates and farmer and agronomist outreach materials. Additionally, ensuring the seeds are distributed and planted at the right times is essential and an ongoing consideration that is managed and improved year on year.
- **Environmental safeguards in renovation projects should not be overlooked –** Renovation projects can have unanticipated impacts on forest conservation if not properly managed. For example, if farmers cut down old growth or shade trees in addition to replacing non-productive coffee trees, the consequence of deforestation and loss of forest connectivity can lead to deterioration of water resources and biodiversity. Program implementers should include safeguards in the design of their projects and ensure their implementation at farm level.

For more information, please contact: Starbucks Social Impact Team, socialimpact@starbucks.com; Raina Lang, Director, Sustainable Coffee Markets, CI, rlang@conservation.org

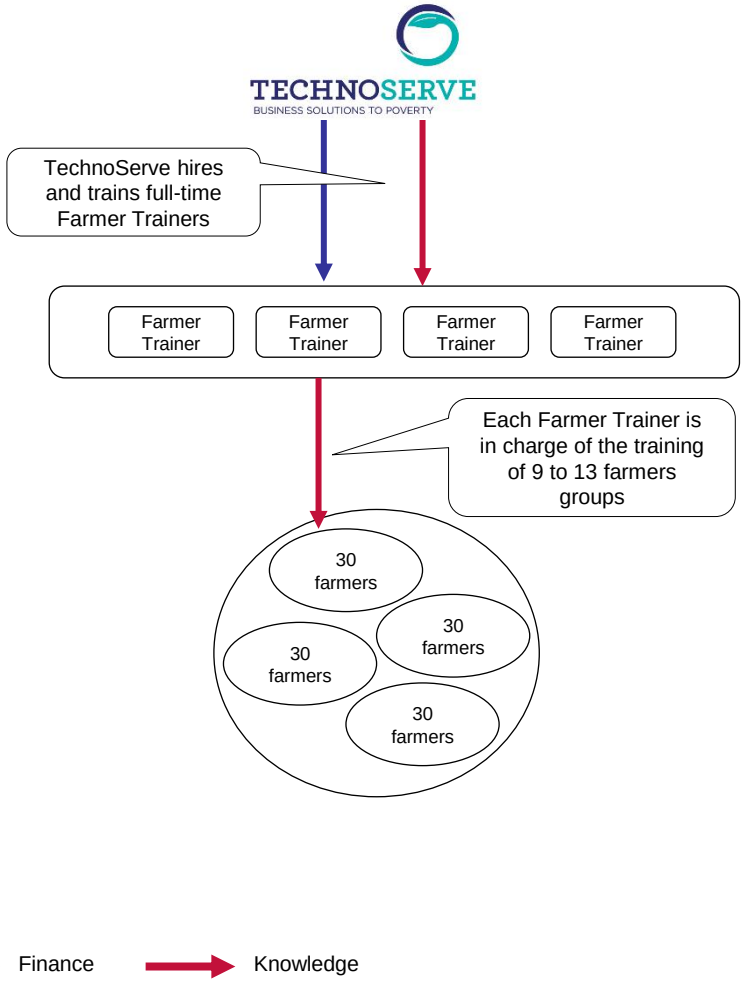
Sources: Sustainable Coffee Challenge, *The Opportunity for Renovation at Scale – Meeting the needs of 1B+ new trees to restore productivity and sustain supply chain,* 2017 – Dalberg interviews

Case study 6: Adoption of GAP and rehabilitation programs lead to production uplift in East Africa in spite of ageing trees (1/2)

The Coffee Initiative - *TechnoServe*

R&R type	Grant-based rehabilitation[1]
Countries	East Africa (Ethiopia, Kenya, Rwanda, Tanzania)
Cost	USD 47 million in 2008 and USD 18 million in 2012[2]
Dates	2008 - 2016
Project context	• The 5 million SHFs across East Africa have (on average) 50% lower yields than those in Central America. The primary reason is the lack of adoption of Good Agricultural Practices (GAP). • Rehabilitation alongside GAP can enable farmers to reach good levels of productivity, even for trees above the productivity peak. Renovation is not always needed.
Objectives, activities, and results	• The Coffee Initiative developed the Farm College program. The Coffee Initiative recruited farmer trainers, mostly daughters and sons of local coffee farmers, to deliver training on GAP and on rehabilitation practices to farmers. Each farmer trainer was responsible for training between nine and 13 groups of 30 or more farmers. Every training group selected a member who volunteered his/her land as a demonstration plot. • The monthly lessons included sessions on pruning techniques, rejuvenation, pest and disease management, coffee planting, and the safe use of pesticides. • In total, 139,609 farmers were trained. • Value creation: increased yields of least productive SHFs and improved livelihoods. • Value capture: the program finances a public good. The value is yet to be captured by the financers.

Figure 1: Farm college programs – overview of technical assistance delivery to farmers



Notes: (1) Philanthropic rehabilitation is part of one of the three strategies of the Coffee Initiative. The two other strategies are the assistance of farmers in the establishment of coffee processing stations and the strengthening of the overall value chain to enhance the competitiveness of the East African Specialty coffee. (2) This amount was mobilized for the whole project and not specifically for the rehabilitation program. Sources: *Coffee Initiative Final Report,* TechnoServe – Dalberg interviews

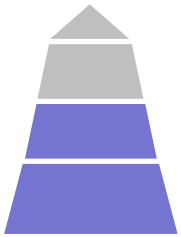
Case study 6: Adoption of GAP and rehabilitation programs lead to production uplift in East Africa in spite of ageing trees (2/2)

Project context

Coffee viability

- **Relevance**: SHFs in East Africa typically have low yields and have potential for yield uplift by applying GAP and R&R (e.g. potential of 92% net income increase from yield improvements in Ethiopia, 138% in Kenya, 85% in Tanzania and 63% in Uganda[1]).
- **Willingness:** SHFs lack short-term willingness to renovate old trees due to lack of knowledge and unwillingness to forego short-term income. This hurdle can be overcome by implementing demonstration plots.

Farmer segmentation



- **Country situation:** SHFs are mostly dependent on intermediaries to access markets and are largely disconnected from technical assistance, inputs and providers. However, situations differ across countries (e.g. cooperatives are stronger in Kenya)
- **Program segmentation:** The program targets SHFs in loose value chains or with inconsistent access to markets.

R&R need

- **Country need:** Over 50% of the coffee trees in East Africa are over 50 years old. However, renovation is not always needed. A good level of productivity can be obtained through rehabilitation.
- **Program objectives:** Train close to 140,000 farmers around GAP and rehabilitation techniques to increase their productivity.

Management of the three R&R components

Inputs

- **Providers:** Third party companies
- **Challenges faced:** Few farmers use fertilizers, and lack knowledge on how to use them correctly (amount, timing, and type of fertilizers).
- **Solution:** The Coffee Initiative commissioned soil and leaf surveys to better understand the existing soil conditions and nutrient needs in each country, allowing the development of localized nutrition recommendations included in Farm College trainings. Private agro-input suppliers were supported to adopt recommendations and linkages to cooperatives.

Finance

- **Providers:** The Bill and Melinda Gates Foundation to TechnoServe.
- **Challenges faced:** More investment is needed in the sector, but the private sector is reluctant to engage alone.
- **Solution:** The project aims to create partnerships between business, public sector, and NGOs. For example, Nib Bank (Ethiopia) agreed to continue providing working capital to cooperatives when the Coffee Initiative ended on the condition that the coffee unions hire business advisors to provide TA.

Knowledge

- **Providers:** The Coffee Initiative
- **Challenges faced:** Farmers have low access to TA and may be reluctant to implement new practices.
- **Solution**: The Coffee Initiative developed a decentralized training program, the "Farm College program": they recruited full-time Farmer Trainers to deliver training to groups of farmers. This structure enables Farmer Trainers to make visits and follow up with individual farmers.

Lessons learned

- **Rehabilitation is sometimes preferable to renovation:** Rehabilitation is less risky, results are faster and requires less investment than renovation. Whenever old trees can maintain productivity via intensive rehabilitation, this option should be preferred over renovation.
- **Adoption of a set of yield enhancing practices is essential to support R&R:** After the training, 56% of participating farmers had adopted at least 50% of the agronomic techniques from a baseline of 15%.
- **Farmers sometimes have to "See it to believe it":** Each farmer group elected a "Focal Farmer" who provided a venue for trainings and a 40-tree demonstration plot. This approach proved to be effective as farmers immediately practiced the techniques they learned.

For more information, please contact: Carole Hemmings, Global Coffee Sustainability Director, TechnoServe, chemmings@tns.org

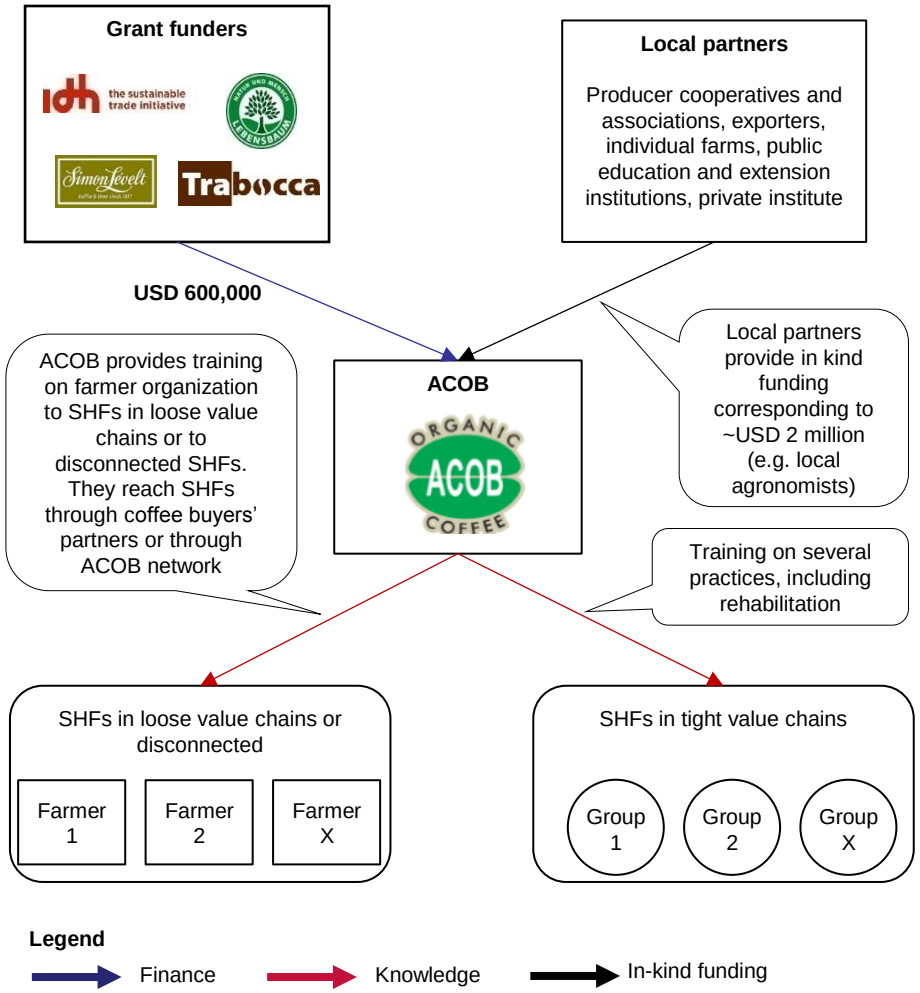
Source: (1) TechnoServe and GCP, *Economic Viability of Coffee Farming*, 2017

Case study 7: A grant funded program in Brazil educates farmers around process-oriented practices, such as rehabilitation, and more sustainable inputs-oriented practices (1/2)

Producer training project - *ACOB*

R&R type	Grant-based rehabilitation[1]
Country	Brazil
Cost	USD 0.66 million in cash and USD 2 million in-kind
Dates	2014 - 2017
Project context	• Brazil is a specific case for renovation: about 50% of coffee is produced by large farmers who integrate R&R as part of their regular agricultural practices. • Climate change associated to poor practices have been causing quality, productivity and economic issues to the whole supply chain and severe water issues. • Over use or wrong use of inputs lead to input losses, high costs and socio-environmental impacts. • Small and medium farmers not reaching the better markets, and reaching lower price markets.
Objectives, activities, and results	• The overall purpose of the producer training project delivered by ACOB is to "*innovate and promote sustainability in the coffee sector offering smart, low cost, clean, simple, innovative and efficient practices to producers*". • ACOB trained 2705 coffee farmers on GAP, rehabilitation practices, coffee quality and group organization.153 training sessions were performed • Value creation: increased yields, reduced costs, added value to the coffee sold, improved livelihoods, reduced land degradation; coffee plots and coffee farms are more resilient to climate change • Value capture: the program finances a public good – finance providers do not directly capture the value created

Figure 1: Structure of the project



Notes: (1) Promoting rehabilitation is one of the objectives of the producer training project. Objectives include (i) promote smart and low cost practices to increase yields and sustainability, (ii) increase coffee quality, (iii) implement practices to make coffee more CLIMATE resilient, (iv) support farmer organizations and (v) support women in all the parts of the value chain.
Source: ACOB, *Producer training project*, 2017 – Dalberg interviews

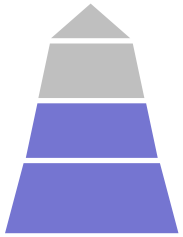
Case study 7: A grant funded program in Brazil educates farmers around process-oriented practices, such as rehabilitation, and more sustainable inputs-oriented practices (2/2)

Project context

Coffee viability

- **Relevance**: The region where the project operates is exposed to climate change but looks to maintain coffee production in the long-run. SHFs could benefit from yield uplift through the adoption of GAP and R&R.
- **Willingness:** SHFs are willing to be included in the program as soon as they see economic, or social, results in demonstration plots or at their peers' farms.

Farmer segmentation



- **Country situation:** 50% of coffee in Brazil is produced by farmers with land < 8 ha. Whereas large producers are mostly organized, SHFs lack formal organization.
- **Program segmentation:** The program targets SHFs in loose value chains, with farm size averaging 5 ha. Disconnected farmers receive training on farmer organization.

R&R need

- **Country need:** There is no need for large renovation programs in Brazil. Large producers already integrate renovation on a rolling-basis. Small farmers could benefit from production increases if they applied proper rehabilitation practices.
- **Program objectives:** Promote sustainable ways to increase production by SHFs, including rehabilitation.

Management of the three R&R components

Inputs

- **Providers:** The program does not have an input distribution component.
- **Challenges faced:** Brazilian farmers can typically access the needed inputs (e.g. fertilizers), but sometimes struggle to use them correctly (amount, timing and type of agrochemicals).
- **Solution:** The program teaches SHFs to use process-oriented practices and more sustainable use of input-oriented practices. Pruning, stumping and replanting are part of these practices.

Finance

- N/A : No finance provided to SHFs

Knowledge

- **Providers:** ACOB and partners
- **Challenges faced:** Farmers lack training on smart agricultural practices, on climate & water issues, on coffee quality and on producer organization.
- **Solution**: ACOB offers 4 training modules to farmers, under the form of field trainings, group trainings and publications. One of the modules, "Sustainable coffee management" includes education on R&R.

Lessons learned

- **Showing real-life example of success helps farmers to engage with new practices:** Seeing short-term economic benefits of the new practices helped farmers and their peers to adopt new practices. Program implementers should screen practices leading to short-term economic results and promote them to farmers.
- **Investing in renovation without analyzing the soil and micro-climate conditions is risky:** Renovation is advised when rehabilitation can no longer recoup yields. Yet, if trees, soil and environment are mismanaged, positive effects from renovation will not last. ACOB is training farmers on soil and micro-climate management practices to make future renovation investments sustainable.

For more information, please contact: Cassio Moreira, *cassiofrancomoreira@gmail.com*

Notes: (1) Funders include IDH, Simon Levelt, Trabocca and Lebensbaum. Source: ACOB, *Producer training project*, 2017; Dalberg interviews.

Case study 8: A project focusing on farmer aggregation in Uganda created an enabling environment for future R&R projects (1/2)

Building Coffee Farmers' Alliances in Uganda - *HRNS*

R&R type	Grant-based technical assistance and capacity building
Country	Uganda[1]
Cost	~USD 4 million
Dates	2009 - 2013
Project context	• Coffee farmers in Uganda typically have low yields, are unorganized, and have weak connections to markets. There is a lack of aggregation points to reach farmers and to implement project activities.

Objectives, activities, and results	• The project seeks to improve livelihoods of coffee SHFs through improved coffee production and increased revenues. The first step is to aggregate producers into organized groups.
	• The project aggregated SHFs into two-tiered organizations:
	  ○ 570 "Producers Organizations" (PO) at village level;
	  ○ 32 "Depot Committees" (DC) combining 20-30 POs at sub-county level.
	• The project also created the apex organization "Uganda Coffee Farmers Alliance (UCFA)". Its key function is to support the marketing of the coffee bulked by the DCs and facilitating linkages with other service providers (e.g. inputs, technical assistance)
	• These organizations serve as entry points to implement various activities that lead to positive results:
	  ○ Yield uplifts (from 1kg per tree per year to 2.5-2.7kg).
	  ○ Quality improvement (adoption of better harvesting and post-harvesting practices)
	  ○ Positive outcomes in gender-related activities (e.g. joint household planning and decision making, equitable access to household resources).
	• Value creation: strengthened SHF capacity, increased yields of least productive SHFs, and improved livelihoods
	• Value capture: the program finances a public good – finance providers do not directly capture the value created.

Figure 1: Apex organization and two-tiered organizations created through the Building Coffee Farmers' Alliances project

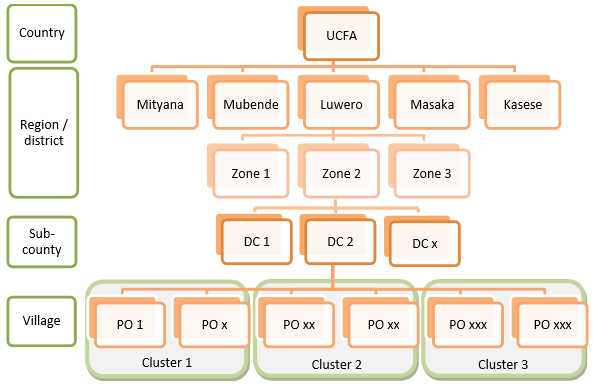
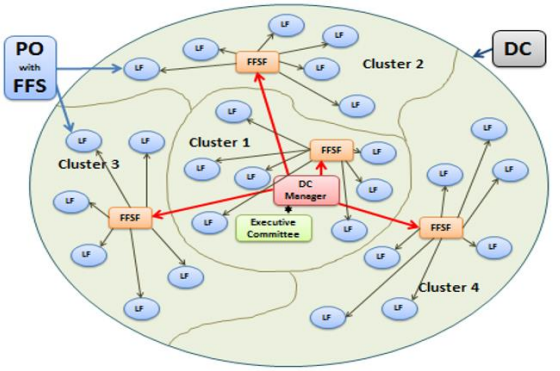


Figure 2: Organization at Depot Committee level



Each DC company has a similar structure: a board (with legal, financial and marketing committees), a manager, Farmer Field School facilitators and a number of lead farmers.

Legend

DC: Depot Committee **PO:** Producer Organization
FFS(F): Farmer Field School (Facilitator) **LF:** Lead Farmers

Notes: 1: The project evaluation was limited to two project regions in Uganda: Luwero and Bukomansimbi. All figures mentioned in this case study refer to the evaluation in these two regions. Source: HRNS, *Building Coffee Farmers' Alliances in Uganda Project evaluation*, 2013

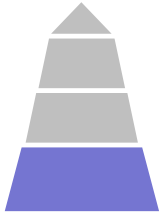
Case study 8: A project focusing on farmer aggregation in Uganda created an enabling environment for future R&R projects (2/2)

Project context

Coffee viability

- **Relevance:** SHFs in Uganda are on five times less productive than Vietnamese SHFs. There is an important potential for yield uplift by applying GAP and R&R.
- **Willingness:** High competition between traders promotes the trading and sale of poor quality coffee, with few incentives for the farmers to invest in the improvement of the quality of their product. Price premiums for quality would incentivize farmers to invest.

Farmer segmentation



- **Country situation:** 1.7 million farmers are growing coffee in Uganda, mostly Robusta. They are typically small farmers (average of 200 trees), mostly unorganized and weakly connected to markets.
- **Program segmentation:** The program targets disconnected and unorganized farmers.

R&R need

- **Country need:** Coffee trees in Uganda are on average 50 years old. Most of them would require renovation or intensive rehabilitation alongside with GAP.
- **Program objectives:** The program does not focus on R&R *per se*, but creates farmers structures that can later serve as entry points for R&R implementers.

Management of the three R&R components

Inputs

- **Providers:** HRNS, DCs, POs, third party companies.
- **Challenges faced:** Only 34% of SHFs used inputs before the start of project.
- **Solution:** Access to inputs, for demonstrations, was a key component of the program. Various activities such as the distribution of free seedlings and fertilizers to farmers holding demonstration plots led to a doubling in the use of inputs by SHFs.

Finance

- **Providers:** Various sources[1]
- **Challenges faced:** Farmers, in general, lack access to finance and are not able to cover expenses associated with improved production techniques.
- **Solution:** The project supported the formation of several "Village Saving and Loan Associations" by strengthening financial literacy of farmers. A pilot project for commercial lending has been designed by KFW, Opportunity Bank, HRNS, and UCFA.

Knowledge

- **Providers:** HRNS, DCs
- **Challenges faced:** Lack of managerial and agronomic knowledge at organization and farmer levels.
- **Solution:** HRNS has trained DC leadership in managerial capacities (coffee management, book keeping and planning, auditing, market information, etc.) and farmers in good agricultural practices through the establishment of Farmer Field Schools . DCs monitor the ongoing FFS activities.

Lessons learned

- **Organizing farmers is a prerequisite to be able to implement R&R program -** Providing R&R packages to disconnected farmers comes at high cost and with low efficiency. The structures created by HRNS (POs, DCs and UCFA) enable third parties and sector stakeholders to easily reach farmers with their services, paving the way for future R&R programs. They also served as entry points for other structures (e.g. NGOs specialized in health and education).
- **Success largely depends on the ability to provide technical advice to farmer organizations (DCs and POs) -** Farmer organizations should have the ability to provide TA and to manage loans to farmers. Currently, DCs have weak management and financial capacities and require more assistance. UFCA has not enough capacity to fully support TA to DCs, and relies heavily on external finance (approx. 75%) This has improved to about 60%.
- **Farmer organizations should provide extension services to farmers on a professional basis -** The farmer adoption rate of GAP was, on average, high, but providing extension services on a purely voluntary basis is not sustainable. Farmer organizations need to hire staff specifically dedicated to implementing extension services.

For more information, please contact: Stefan Cognigni, stefan.cognigni@hrnstiftung.org

Note**:** (1) Program funders include the European Union (EU), the Bill and Melinda Gates Foundation, International Coffee Partners (ICP), USAID, Agribusiness Initiative (aBi), Plan Uganda, the Food and Agriculture Organization (FAO), and the Douwe Egberts Foundation (DEF). Funders entered at different stages of the project. Source: HRNS, *Building Coffee Farmers' Alliances in Uganda Project evaluation*, 2013

Contents

Overview of the 40 R&R programs studied for this Guidebook – ordered by geographic region (1/5)

NOT EXHAUSTIVE

Global programs

Program name	Period	Status	R&R focus[1]	Execution partner(s)	Finance provider(s)	Cost (USD)[2]	Targeted / reached impact	Lead actor	Country
Nescafé Plan[3]	2010-2020	◑		Nestle			• Objective: 220 million plantlets distributed by 2020	Retailer / Roaster	Global (14 countries)
Counter Culture Coffee Study and funding	2013	◑	/	Duke University	Counter Culture coffee		• USD 40,000 seedling grants distributed • Study on climate change adaptation	NGO / Foundation	Global
Coffee and Climate	2010 - 2019	◑		HRNS				NGO / Foundation	Global
Nespresso AAA[4]	2010 - 2020	◑	/	Nespresso / Local partners	Nespresso			Retailer / Roaster	Global
Global coffee monitoring program	2016 - 2022	◑		World Coffee Research	Various		• Objectives: implement a network of research plot farm around the world	NGO / Foundation	Global

Latin America and Mexico

Program name	Period	Status	R&R focus	Execution partner(s)	Finance provider(s)	Cost (USD)	Targeted / reached impact	Lead actor	Country
Producer training program	2014 - 2017	●		ACOB	Various sources	0.6M in cash, 2M in kind	• 2,500 SHFs trained • Yields: +80%	NGO / Foundation	Brazil
Competitividad Programa	1998 - 2005	●		FNC				Public sector	Colombia
Permanencia, Sostenabilidad, Futuro (PSF)	2009 - 2013	●		FNC	Ministry of Agriculture, Finagro, Banco Agrario, the National Coffee Fund	600 million	• 184,000 ha renovated • Less than 1% of guarantees called in	Public sector	Colombia
National Program for Coffee Plantation Renewal (PNRC)	2010-2015	●		Ministerio Agricultura Ganaderia	ICAFÉ, MAG, Banco Nacional de Costa Rica	81 million	• Objective: 16,033 ha renovated • Results: 16% achieved	Public sector	Costa Rica

Legend: ◑ Under implementation ● Completed Renovation Rehabilitation

Notes: (1) We consider programs addressing at least one component of renovation project as "renovation program". It was not always clear which programs focused specifically on rehabilitation and which programs focused on TA. We excluded from programs that were not specifically mentioning pruning, stumping of grafting techniques, but we have included some programs in which these techniques are part of broader packages. (2) All costs are converted into dollars using the average yearly conversion rates of the starting year of the program. (3) One of the component of the Nescafe Plan is renovation. (4) One of the component of the Nespresso AAA program is R&R

Overview of the 40 R&R programs studied for this Guidebook – ordered by geographic region (2/5)

NOT EXHAUSTIVE

Latin America and Mexico

Program name	Period	Status	R&R focus	Execution partner(s)	Finance provider(s)	Cost (USD)	Targeted / reached impact	Lead actor	Country
Proyecto de Reactivación de la Caficultura Ecuatoriana	2012 - 2020	◑	Renovation	Ministry of Agriculture (MAGAP)	Government, e Banco Nacional de Fomento (BNF)	1.6 million	• Objective: renovate 135 ha • Results: 19% achieved in 2015	Public sector	Ecuador
El Salvador Coffee rehabilitation and agricultural diversification project	2014 - 2019	◑	Rehabilitation	NCBA CLUSA	USDA	12.9 million	• Objective: improve the capacity of 50 co-ops, renovate 6000 has, and benefit 7500 farmers • USD 12.9m of funding approved	Public sector	El Salvador
Blended finance facility	2016	◑	Renovation	NCBA CLUSA	Banco Hipotecario, USDA	325,000 guarantee (USDA)	• Distribute loans totaling USD 6.5 million to coffee SHF	NGO / Foundation	El Salvador
Café Verde Project	2012 - 2016	●	Renovation	Catholic Service Relief				NGO / Foundation	Guatemala
Rural Value Chain project	2012 – 2017	◑	Renovation / Rehabilitation	Anacafe	USAID	42 million	• 129 SHF organizations beneficiaries • Yields: + 62% • 3,187ha renovated	NGO / Foundation	Guatemala
Program to Support Small Producers (PAPP)	2008	●	Renovation	IHCafé	IHCafé, National Coffee fund	20 million	• Support to 23,000 SHFs for replanting on 1 manzana (0.71ha)	Public sector	Honduras
Emergency Program for Small Producers (PEEPP)	2008	●	Renovation	IHCafé	Banco Nacional de Desarollo Agricola	20 million		Public sector	Honduras
Emergency Credit Program against La Roya	2013 - 2015	◑	Renovation	IHCafé	Banco Continental and Banco Hondunero	6.4 million and 11.8 million	• Banco Continental provided 2,200 loans • Banco Hondureno provided 2,900 loans	Public sector driven	Honduras
Programa de Produccion sostenible de Café	2015 - 2020	◑	Renovation	Cohondu Cafe	Grupo Caldega	2.14 millions	• Objective: renovate 1 million tree and provide TA to 50 millions SHFs	Trader	Honduras

Legend: ◑ Under implementation ● Completed Renovation Rehabilitation

Overview of the 40 R&R programs studied for this Guidebook – ordered by geographic region (3/5)

NOT EXHAUSTIVE

Latin America and Mexico

Program name	Period	Status	R&R focus	Execution partner(s)	Finance provider(s)	Cost (USD)	Targeted / reached impact	Lead actor	Country
The Rust Trust Fund	2012	●	Renovation	Roger Family Company	San Francisco Bay Coffee	0.5 million	• Objective: replant 50 millions trees	Retailer / Roaster	Mexico
Por Mas Café	2014	◑	Renovation	Exportadora de Café California	Ve Por Mas		• To date, 5000 farmers have received loans	Trader	Mexico
Plan Integral de Integracion de Café (PIAC)[1]	2015 - 2019	◑	Renovation	Ministry of Agriculture (SAGARPA)	Government of Mexico		• 57 tons of certified seedlings planted • 106,000 hectares renovated	Public sector	Mexico
ECOM – IFC – IDB – Starbucks facility	Since 2013	◑	Renovation	ECOM	IFC, IDB, Starbucks	30 million	• Renovate 5000 hectares of land	Trader	Nicaragua
Rust to Resilience	2014 – 2016	●	Renovation	Catholic Service Relief, CIAT	MAC Fondation			NGO / Foundation	Nicaragua
Coffee Renovation program	2013 - 2017	●	Renovation	Ministry of Agriculture and Irrigation	Agrobank	70 million	• Objective: 80,000 ha renewed	Public sector	Peru
Café Curimbaba Project	2013	●	Renovation	AVSI	Enel (70%) and farmers		• 5 ha replanted	Trader	Peru
					Multiple countries				
Coffee Farmer Resilience Initiative	2013 - 2016	●	Renovation	Root Capital	Root Capital, USAID, Keurig, Starbucks	23 million	• 1.5 millions lending, Honduras • 3.5 millions lending, Nicaragua • 2.7 millions lending, Peru	Financial institution / Social lender	Honduras,, Nicaragua, Peru
Better Harvest (Cosecha)	2014 - 2018	●	Rehabilitation	Technoserve	USAID, J.M. Smucker, PIMCO Foundatation	3.9 million	• Technical Assistance to 2,000 farmers in El Salvador • Technical Assistance to 4,000 farmers in Nicaragua	NGO / Foundation	El Salvador, Nicaragua

Legend: ◑ Under implementation ● Completed Renovation Rehabilitation

Notes: (1) Renovation is one component of the PIAC.

Overview of the 40 R&R programs studied for this Guidebook – ordered by geographic region (4/5)

NOT EXHAUSTIVE

Latin America and Mexico

Program name	Period	Status	R&R focus	Execution partner(s)	Finance provider(s)	Cost (USD)	Targeted / reached impact	Lead actor	Country
Starbucks - One Tree for Every Bag Commitment Program	2015-2017	◑	Renovation	Conservation International, ECOM, local suppliers	Starbucks		• Distributed nearly 30 million trees in 2017 • Extended commitment to 100 million trees by 2025	Roaster / Retailer	Mexico, Guatemala, El Salvador
Seed Verification Program	2016 - 2020	◑	Renovation	World Coffee Research	10% from the sale of roasted coffee	35,000	• Verification of seeds at nursery level	NGO / Foundation	El Salvador, Guatemala, Nicaragua

Africa

Program name	Period	Status	R&R focus	Execution partner(s)	Finance provider(s)	Cost (USD)	Targeted / reached impact	Lead actor	Country
Programme de relance Cafeiere[1]	2014 - 2019	◑	Rehabilitation	Government of Cote d'Ivoire			• Objectif: increase national coffee production by 200,000 tons • Interim results: stumping and pruning of 10 300 ha	Public sector driven	Cote d'Ivoire
Introduction of new coffee varieties	2016 - 2020	◑	Renovation	NAEB, World Coffee Research	Rwanda Agriculture Board		• Introduce new yielding coffee varieties and test them	NGO / Foundation	Rwanda
The Coffee Partnership of Tanzania	2012	●	Rehabilitation / Renovation	KfW	KfW		• Training to GAP • More than 1,500,000 improved coffee seedling have been planted by SHF	Financial institution / Social lender	Tanzania
Building Coffee Farmers' Alliances	2009 - 2013	●	Capacity Building[2]	Technoserve	European Union, Gates Foundation	4 million	• Set-up farmers organizations	NGO / Foundation	Uganda

Legend: ◑ Under implementation ● Completed Renovation Rehabilitation

Notes: (1) Rehabilitation is one of the components of the "Programme de relance Cafeiere". (2) The HRNS isn't strictly an R&R program but works to increase capacity of future R&R efforts

Overview of the 40 R&R programs studied for this Guidebook – ordered by geographic region (5/5)

NOT EXHAUSTIVE

Africa

Program name	Period	Status	R&R focus	Execution partner(s)	Finance provider(s)	Cost (USD)	Targeted / reached impact	Lead actor	Country
Coffee Initiative	2008 - 2017	●	Rehabilitation	Technoserve	Bill and Melinda Gates Foundation	47 million and 18 million in 2012	• 267,987 trained farmers across East Africa, • +70% yield increase	NGO / Foundation	Ethiopia, Kenya, Rwanda and Tanzania

Asia

Program name	Period	Status	R&R focus	Execution partner(s)	Finance provider(s)	Cost (USD)	Targeted / reached impact	Lead actor	Country
Nursery Program	2016 - 2030	◑	Renovation	Indonesian Coffee Research Institute	FAO			Public sector	Indonesia
Peremajan Kopi	2017	◑	Renovation	Kepahiang government				Public sector	Indonesia
Industry-wide renovation pruning	1990	●	Rehabilitation	AIDAB and CIC				Public sector	Papua New-Guinea
Productive Partnership in Agriculture	2010 - 2019	◑	Renovation	Ministry of Agriculture	World Bank		• Improve livelihoods of coffee and cocoa SHFs	Financial institution / Social lender	Papua New Guinea
Coffee replanting in Vietnam	2013	●	Renovation	WASI	Nestle			Retailer / Roaster	Vietnam
VnSAT – Rejuvenation in the Central Highlands	2014 - 2020	●	Renovation	Ministry of Agriculture	World Bank. Bank of Vietnam	314 millions[1]	• Objective: replant 90,000 ha and transplant 30,000 ha in 5 regions	Public sector	Vietnam

Legend: ◑ Under implementation ● Completed Renovation Rehabilitation

Notes: (1) This budget is for the wider Sustainable Agriculture Transformation plan that includes the renovation program.

Contents

We have completed 48 interviews with CAN members, country experts, coffee experts and programs implementers (1/3)

Contact Name	Organization	Position
Ashley Prentice & Evelio Francisco Alvadaro Romero	Anacafé	Responsible USAID program
Willem Boot	Boot Coffee	CEO
Cassio Franco Moreira	Brazil's Association of Organic Coffee (ACOB)	Executive Director
Christian Bunn	CIAT	Research fellow
Meredith Taylor	Counter Culture Coffee	Sustainability manager
Edgardo Alpizar	ECOM	Genetic material selection specialist
Laurent Bossolasco	ECOM	Asia representative
Ben Coney-Moran	Fairtrade USA	Researcher
Daniel Cifuentes	Farmer Brothers	Producer Relations Coordinator
N'Guyen Lien	GCP	Vietnam representative
Jan von Enden	HRNS	Managing Director North America
Jose Sette	ICO	Executive Director
Mariana Petrei	IFC	Senior Investment officer
Daniel Martz	JDE	Head of Corporate Affairs, Sustainability
Vera Espindola	Mexico's SAGARPA	SAGARPA Sustainability and Shared Value National Plan for Coffee and Cocoa
Mark Kauw	Moyee Coffee	Author

We have completed 48 interviews with CAN members, country experts, coffee experts and programs implementers (2/3)

Contact Name	Organization	Position
Stanley Kuehn	National Cooperative Business Association (NCBA CLUSA)	Regional director for Latin America
Julie Reneau	Nespresso	Sustainable Strategy Director
Orlando Garcia	Nestle	Nescafé Plan Manager Zone America at Nestle Brazil
Catalina Eikenberg	Neumann Kaffee Gruppe	Head of Sustainability
Camilo Sanchez	OLAM	Coffee Corporate Responsibility & Sustainability Manager
Tristan Lecomte	PUR Project	Co-founder and CEO
Mario Arroyo Uder and María Paz Lobo Zeledón	Icafé, Costa Rica	Promotion Director
Helene Roy	Rainforest Alliance	Senior Project Manager
Paolo van der Ven	Rd2 Vision	Consultant
Elizabeth Teague	Root Capital	Social & Environmental Performance Manager
Luke John Swainson	Root Capital	Indonesia Representative
Tesfaye Negash	UTZ	Ethiopia representative
David Piza	S&D Coffee and Tea	Director Americas
Andrea Olivar	Solidaridad	International Program Manager - coffee
Kim Elena Ionescu	Specialty Coffee Association (SCA)	Chief Sustainability Officer
Derek Bothereau & Kelly Goodejohn	Starbucks	Senior Manager Global Responsibility and Director of Ethical Sourcing

We have completed 48 interviews with CAN members, country experts, coffee experts and programs implementers (3/3)

Contact Name	Organization	Position
Colman Cuff	Starbucks	Managing Director, Starbucks Coffee Trading Company
Christopher Von Zastrow	Starbucks	Director of Coffee Sustainability
Carlos Rodriguez	Starbucks	Head of Agronomy
Christy Slay	Sustainability Consortium	Director or Research, R&R specialist
Stephanie Daniels	Sustainable Food Lab	Manager
Paul Stewart, Julian Wassenaar, Carol Hemmings and Juli Cho	TechnoServe	Various
Kevin Fath	USAID	Agriculture Development Specialist
Kaj Gass & Mark Rossman	USDA	International Agricultural Program Specialist
Stacy Bocskor & Christiane Hornikel	UTZ	Business Development Manager
Miguel Gamboa	UTZ	Head of Regional Development Americas
Ruben Gallozi	UTZ	Country Representative Honduras
Mario Barboza	UTZ	Program Officer Nicaragua
Julius Nganga	UTZ	East Africa Field Representative
Chandra Panjiwibowo	UTZ	Indonesia Representative
Pablo Ramirez	Winrock International	Director of blended finance
Hanna Neuschwander; Tim Schilling; Christophe Montagnon	World Coffee Research	Director of Communications; CEO; Scientific Director

Methodology for estimating global R&R need, yield uplift potential, increased value and land saved from deforestation (1/2)

We estimated R&R need across 19 countries…

List of countries in our scope of study:

- Brazil
- Colombia
- Costa Rica
- Cote d'Ivoire
- Ecuador
- El Salvador
- Ethiopia
- Guatemala
- Honduras
- India
- Indonesia
- Kenya
- Mexico
- Nicaragua
- Papua New Guinea
- Peru
- Tanzania
- Uganda
- Vietnam

> 95% of global production

… using various data sources to build accurate estimates

Types of data sources used:

- National census
- Statistics from coffee boards
- Literature from coffee research institutions
- Reports from R&R programs
- Global Coffee Platform's coffee viability reports
- Dalberg interviews with country experts
- We made assumptions informed by experts' opinion and comparable situations when data was not available

Methodology for estimating global R&R need, yield uplift potential, increased value and land saved from deforestation (2/2)

50%	5-20%	1-3B	1-3M
More than 50% of the seven million hectares of global SHF coffee land could benefit from R&R	Global production could increase between 5-20% if R&R is applied to all land in need	Farmers could accrue between USD ~1-3 billion at farmgate prices through increased coffee sales per year	Without R&R, a similar increase in yields and value would require an expansion of coffee land onto ~1-3 million hectares of new land under current yields
CALCULATION			
Total land under cultivation **x** % of land cultivated by SHF **x** % of land where trees have passed their productivity peak and/or are affected by disease **+** % of land where SHF don't use rehabilitation	Estimated yield uplift (low case scenario – high case scenario[1]) **x** Proportion of SHF land that could be renovated / rehabilitated **/** Total current production (for whole country, not just SHFs)	Increased production (low case – high case scenario) **x** Average farmgate price of coffee in 2016 (by country and by variety)	Current SHF yields **/** Potential production increase through R&R (low case scenario – high case scenario)
Total SHF land with R&R need	**Global SHF production increase**	**Increase in value at farmgate prices**	**Total land preserved from deforestation**

Notes: (1) Assumption: The high scenario indicates that countries reach the full yield potential as estimated by GCP studies or country experts. The low case scenario indicates that countries only reach 25% of that potential – i.e. R&R only succeeds at 25% of the land in need, whereas it fails completely on the additional 75%.

Methodology for showing total farmers reached by R&R programs across the farmer pyramid (1/4)

We used a two step approach to estimate the number of farmers reached by R&R programs:

1

Assessing the number of farmers reached by program

- When the number of farmers reached was publicly available, we used this information
- When the number of farmers reached was not available, we made assumptions based on:
  - Number of trees replanted
  - Number of hectares renovated
  - Average size of SHF farm in the country/region

2

Assessing the distribution of farmers across the pyramid

- For each program, we made assumptions on the distribution of farmers reached across the pyramid. When we had no specific information, we based our assumptions on several criteria, such as:
  - If the program did not mention specifically disconnected farmers, we assumed they were not (or minimally) reached
  - If the program targets farmer groups, we assume that 100% of the farmers reached were in tight supply chains
  - For national renovation programs, we assumed that 50% of farmers reached were in tight supply chains and 50% in loose supply chains.

The table in the following pages details our assumptions

Methodology for showing total farmers reached by R&R programs across the farmer pyramid (2/4)

Name of the program	Number of farmers reached[1]	Other information and hypothesis[2]	Total number of farmers	Large & medium	Tight value chains	Loose value chains	Disco-nnected
Better Harvest (Cosecha)	Yes	N/A	7,570	0	1,893	3,785	1,893

Café Curimbaba Project	No	• 175,000 trees distributed
		• Hypothesis:
		  • 2,000 trees / ha
		  • Avg. farm size 2.3 ha
			38	0	38	0	0

Coffee Farmer Resilience Initiative	Yes	N/A	891	0	891	0	0
Coffee Initiative	Yes	N/A	139,600	0	0	69,800	69,800
Coffee renovation in Peru	No	• 80,000 ha replanted • Hypothesis: Avg. farm size 2.3 ha	34,783	0	17,391	17,391	0
Coffee replanting in Vietnam	No	• 270 ha replanted • Hypothesis: Avg. Size of farm: 1.2 ha		0	225	0	0
Competitividad Program	Yes	N/A	40,000	30,000	10,000	0	0
Counter Culture Coffee	Yes	N/A	100		100		
El Salvador Coffee rehabilitation and agricultural diversification project	Yes	N/A	3,800	0	3,800	0	0
Emergency Credit Program against La Roya	Yes	N/A	5,100	510	3,060	1,020	510

Global Coffee Monitoring Program	No	• 150,000 trees replanted
		• Hypothesis:
		  • 2,000 trees / ha
		  • Avg. farm size: 2 ha
			35	17.5	17.5	0	0

Integrated Program for Coffee (PIAC)	No	• 106,000 ha renovated • Hypothesis: Avg. farm size: 2.5 ha	42,400	0	12,720	21,200	8,480

Notes: (1) If publicly available information was able on the number of farmers reached, we wrote “Yes”. (2) When information on the number of farmers reached was not available, we used other information and made assumptions on the number of farmers reached.

Methodology for showing total farmers reached by R&R programs across the farmer pyramid (3/4)

Name of the program	Number of farmers reached[1]	Other information and hypothesis[2]	Total number of farmers	Large & medium	Tight value chains	Loose value chains	Disco-nnected
National Program for Coffee Plantation Renewal (PNRC)	No	• 2,500 ha renovated • Hypothesis: Avg. Size farm: 2 ha	1,250	125	1,000	0	125
National Program for Coffee Plantation Renewal (PNRC)	No	• 2,500 ha renovated • Hypothesis: Avg. Size farm: 2 ha	1250	125	1,000	0	125
National Replanting Program (Permanency Sustainability and Future (PSF) Program)	Yes	N/A	216,312	0	108,156	108,156	0

Nescafé Plan	No	• 220 million plantlets distributed up to 2020
		• Hypothesis:
		  • 50% of the plantlets were distributed
		  • 2,000 plantlets / ha
		  • Avg. farm size: 2 ha
			27,500	2,750	19,250	5,500	0

One Tree for Every Bag Commitment Program	Yes	N/A	5,700	0	2,850	2,850	0
Por Mas Café	Yes	N/A	5,000	1,250	1,500	1,500	750
Producer training project	Yes	N/A	2,500	0	0	1,750	750

Productive Partnerships in Agriculture	No	• 11,500 ha were improved agricultural practices are implemented
		• Hypothesis:
		  • 5000 ha under R&R
		  • Avg. Size of farm: 1 ha
			5,000	0	0	1,500	3,500

Notes: (1) If publicly available information was able on the number of farmers reached, we wrote “Yes”. (2) When information on the number of farmers reached was not available, we used other information and made assumptions on the number of farmers reached.

Methodology for showing total farmers reached by R&R programs across the farmer pyramid (4/4)

Name of the program	Number of farmers reached[1]	Other information and hypothesis[2]	Total number of farmers	Large & medium	Tight value chains	Loose value chains	Disco-nnected
Program to Support Small Producers (PAPP)	Yes	N/A	28,270	0	0	14,135	14,135

Programa de Producción sostenible de Café en Honduras	Yes	• 1 million trees replanted
		• Hypothesis:
		  • 2,000 trees / ha
		  • Avg. farm size: 2.8 ha
			179	0	89	89	0

Programme de relance caféière en Côte d'Ivoire	No	• Stumping and pruning of 10,300 ha • Hypothesis: Avg. farm size: 1.7 ha	6,050	0	3,025	3,025	0
Proyecto de Reactivación Caficultura Ecuatoriana	Yes	N/A	2,743	0	1,372	1,372	0
Renovation in Nicaragua	Yes	N/A	550	220	330	0	0
Rural Value Chains project	Yes	N/A	8,874	0	2,662	6,212	0

The Coffee Partnership of Tanzania	No	• Hypothesis:
		  • 2,000 trees / ha: 750 ha renovated
		  • Avg. Size of farms: 0.5 ha
			1,500	0	600	600	300

The Rust Trust Fund	No	• 2 million trees given
		• Hypothesis:
		  • 2,000 trees / ha: 1,000 ha renovated
		  • Avg. Size of farms: 2 ha
			500	0	500	0	0

VnSAT - Rejuvenation Project in the Central Highlands	No	• 50,000 ha replanted • Hypothesis: Avg. farm size 2 ha	2,500	250	1,000	1,000	250
TOTAL			**591,114**	**35,123**	**192,709**	**262,085**	**101,453**

Notes: (1) If publicly available information was available on the number of farmers reached, we wrote “Yes”. (2) When information on the number of farmers reached was not available, we used other information and made assumptions on the number of farmers reached.