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Country Data Sheets for Coffee Renovation and Rehabilitation

November 2017

Disclaimer

Disclaimer

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November 2017



List of abbreviations

A	Arabica
ABIC	Brazilian Coffee Industry Association
Anacafé	National Coffee Association (Guatemala)
CENTA	Centro Nacional de Técnico Agropecuaria (Extension Service institution, El Salvador)
CIAT	International Center for Tropical Agriculture
CIC	Coffee Industry Corporation (in Papua New Guinea)
FAO	Food and Agriculture Organization
FNC	Federación Nacional de los Cafeteros (Colombia)
FoNC	National Coffee Fund (Colombia)
GAP	Good Agricultural Practices
GCP	Global Coffee Platform
GDP	Gross Domestic Product
Ha	Hectares
HRNS	Hanns R. Neumann Stiftung
ICO	International Coffee Organization
IDB	Inter-American Development Bank
IFC	International Finance Corporation
IHCAFE	Instituto Hondureño del Café (<i>Honduran coffee Institute</i>)
PIAC	Plan Integral de Atención al Café (<i>Integrated Plan for Support to Coffee - Mexico</i>)
PNG	Papua New Guinea
R	Robusta
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
TCDF	The Coffee Development Fund (Tanzania)
UCDA	Uganda Coffee Development Authority
USD	United States Dollars
VnSAT	Vietnam Sustainable Agriculture Transformation
WCR	World Coffee Research

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Introduction: Purpose and contents of the R&R country data sheets

- **This document contains information on 19 countries and their smallholder farmer (SHF) need for coffee Renovation and Rehabilitation (R&R)**
- **The purpose of the document is to give coffee sector stakeholders an overview of how countries' needs and priorities differ, and thereby help identify what type of SHF R&R action is needed where**
 - The document focuses on SHFs need for R&R in countries, as larger farmers are more able to self-finance R&R
- **The document covers the following countries among the world's 19 biggest coffee producing countries:**

– Brazil	– Guatemala	– Papua New Guinea
– Colombia	– Honduras	– Peru
– Costa Rica	– India	– Tanzania
– Côte d'Ivoire*	– Indonesia	– Uganda
– Ecuador*	– Kenya	– Vietnam
– El Salvador	– Mexico	
– Ethiopia	– Nicaragua	
- **The two-page country data sheets build on:**
 - Desk research using sources such as FAO data and country-specific coffee reports
 - Semi-structured interviews with country experts – either from in-country experts or from experts with previous experience in the country
 - Modelling of need and yield uplift estimates
- The country data sheets were developed between July and November 2017

Introduction: How to read the document – the two-page profiles cover six topics relevant to R&R (1/2)

Quick facts

- Basic information on size of national coffee production and share of global production, land under coffee, Arabica/Robusta composition

R&R need and potential

- **Drivers of R&R need.** We distinguish between four drivers of R&R need, and highlight them with colors on profiles according to their relevance :



Age of trees



Exposure to diseases and pests



Climate change (see below)



Sub-optimal agricultural practices

- We highlight these icons on each country profile to indicate their significance in a given country:



Very significant driver of R&R need



Significant driver of R&R need



Not a significant driver of R&R need

- **R&R need:** Number of estimated SHF hectares where either renovation or rehabilitation is needed
- **Uplift potential:** Current estimated SHF yields, and estimated production increase associated with R&R¹

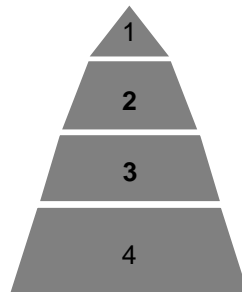
Viability

- Potential climate change impact on coffee growing regions based on CIAT/World Coffee Research Climate Suitability Maps for 2050. Note, these maps are not available for all countries and are modelled estimates only.
- Other viability factors, such as cost of production, prices paid to producers, and information on competing crops

Introduction: How to read the document – the two-page profiles cover six topics relevant to R&R (1/2)

Farmer segmentation

- Segmentation of national farmers into each segment of the “farmer pyramid”:



1. Large & medium farmers that are well connected to value chains and have access to inputs/finance¹
2. SHFs in tight value chains, often organized in farmer organizations and with stable links to traders
3. SHFs in loose value chains, with weak links to value chains and low access to inputs/finance
4. Disconnected SHFs, with weak and erratic links to value chain and no access to inputs/finance

- We highlight each segment of the pyramid to indicate where most farmers are situated



Most farmers are in this segment



Some farmers are in this segment



Few farmers are in this segment

- Average plot size for SHFs and availability of intermediaries (e.g. coops)

Enabling environment

- High-level information on the political environment for R&R and the availability of inputs, finance, and technical assistance (knowledge)

R&R programs

- Information on past and/or ongoing R&R programs in country to help stakeholders identify actors with experience on the ground, and/or to find potential partners for future R&R programs

Introduction: A note on data sources and climate suitability maps (1/2)

Data sources and accuracy

Data sources:

- The main data sources are:
 - FAO data for production and land area, 2014¹ and national census data
 - Global Coffee Platform viability studies – for yield potentials for most countries
 - Interviews with country experts – when data was not available, we asked interviewees to confirm estimates on number of SHFs, yield, etc.

Data accuracy:

- Country level data points tend to vary significantly between sources and it was not possible to verify the accuracy of all data
- Where large differences between the same data points exist (e.g. number of farmers in a given country) we have provided a range

All estimates and conclusions are high-level only and should, whenever possible, be triangulated with more detailed country level analysis

Introduction: A note on data sources and climate suitability maps (2/2)

Climate suitability maps

This document includes climate suitability maps





The climate suitability maps were developed 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.

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.*

Climate suitability maps are courtesy of the International Centre for Tropical Agriculture (CIAT) and World Coffee Research (WCR). For more information on climate suitability maps, please contact Christian Bunn (CIAT) at c.bunn@cgiar.org

How to read the maps:

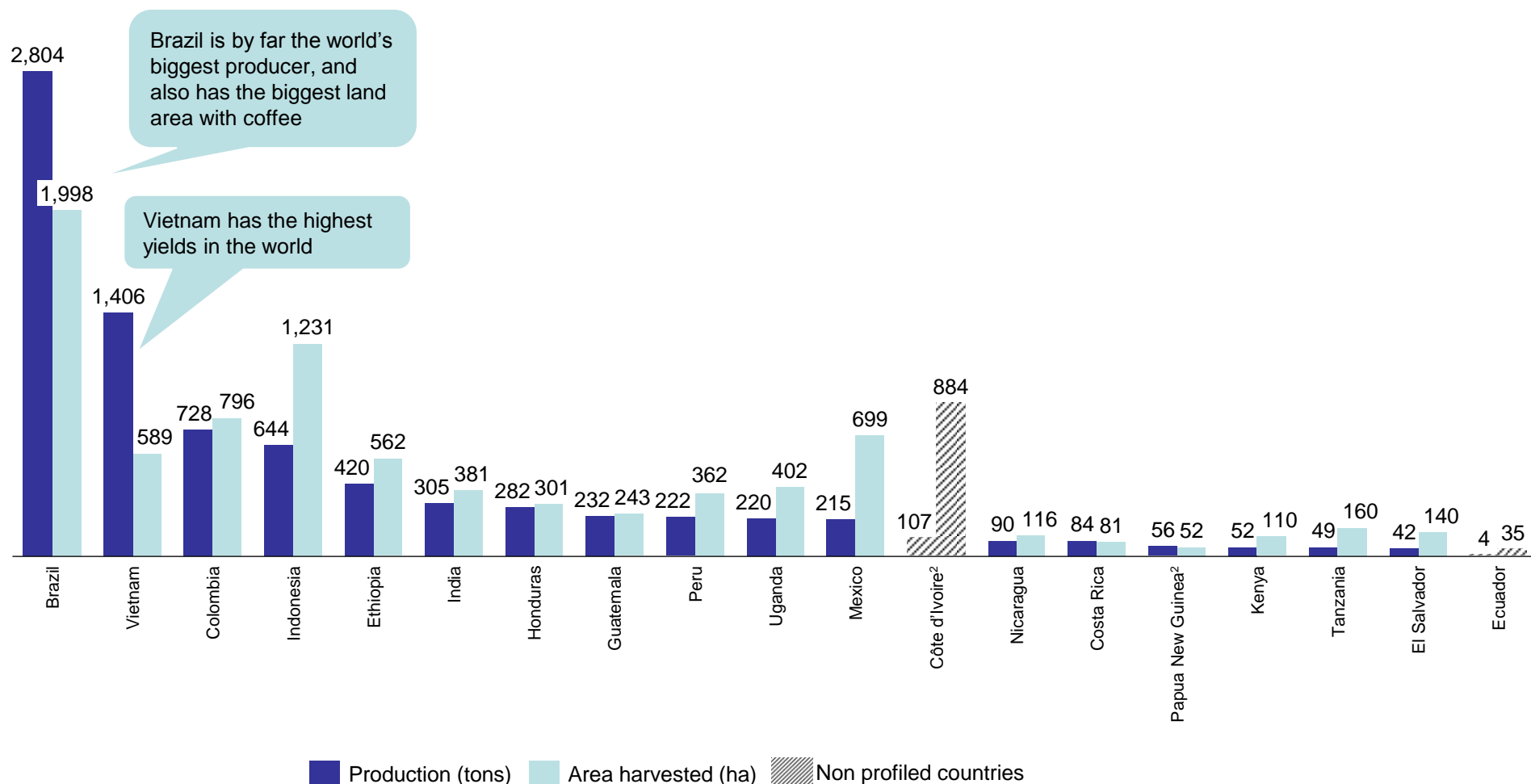
The impact gradient is based on an intermediate business as usual greenhouse gas emissions scenario with a warming well above the Paris goals. The maps differentiate four degrees of climate change:

-  **Unsuitable sites:** Most likely cannot be used for Arabica coffee 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.

Summary: This document profiles 17 of the 19 biggest coffee producing nations

Total production and land under coffee – 19 biggest producers¹

000's tons, 000's hectares, 2014



Notes: (1) FAOSTAT, *Crops: Coffee – Production and Area Harvested 2014, 2017*; Note that FAO's most recent numbers are 2014 and we use these throughout the document to maintain consistency. (2) The estimates on Côte d'Ivoire and Papua New Guinea are highly uncertain since the underlying data varies significantly

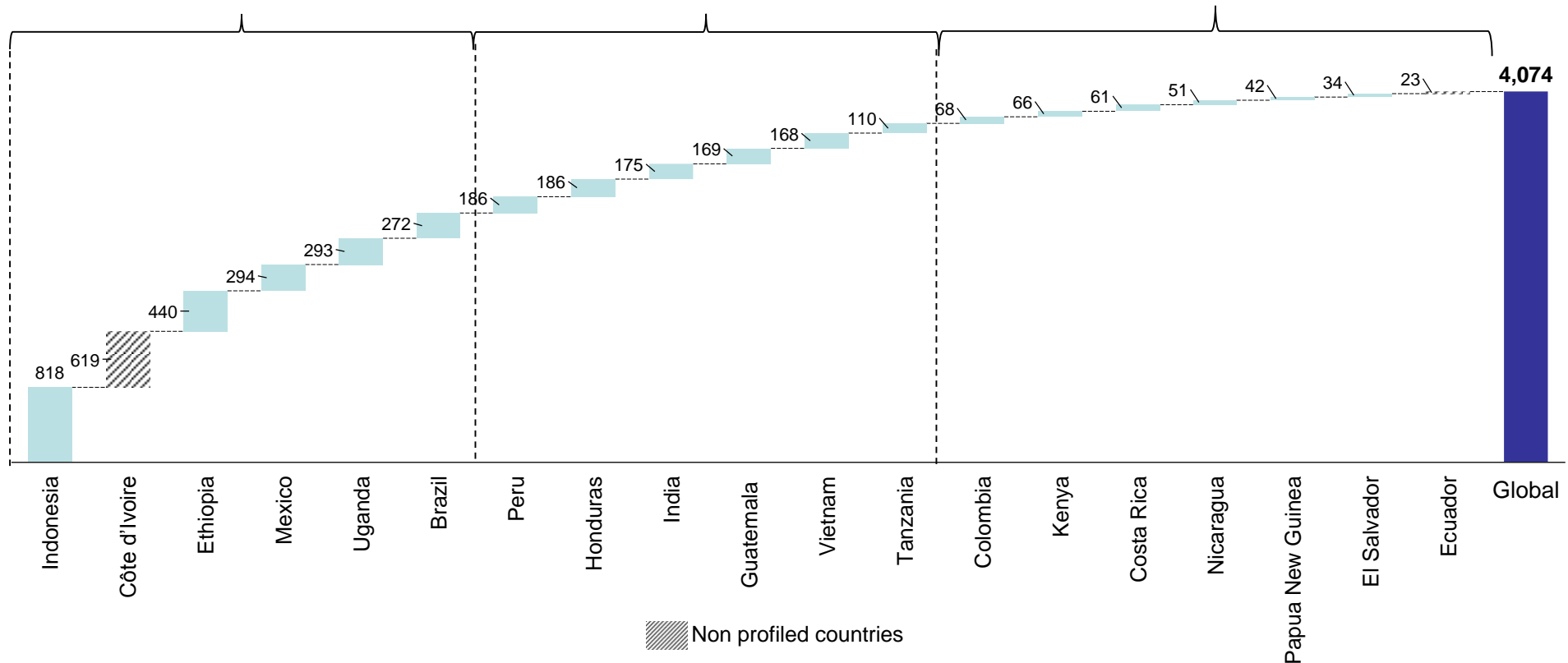
Summary: Indonesia, Côte d'Ivoire, Ethiopia, Mexico, Uganda, and Brazil make up more than half the estimated 4 million global hectares in need of R&R

Estimated land in need of R&R – Globally¹ and per country
000's hectares

High profile countries that each have more than 200,000 hectares in need of R&R. **Collectively account for ~65% of total need**

Medium profile countries that have between 100,000 and 200,000 hectares in need of R&R. **Collectively account for ~25% of total need**

Low profile countries that have between 0 and 100,000 hectares in need of R&R. **Collectively account for ~10% of total need**

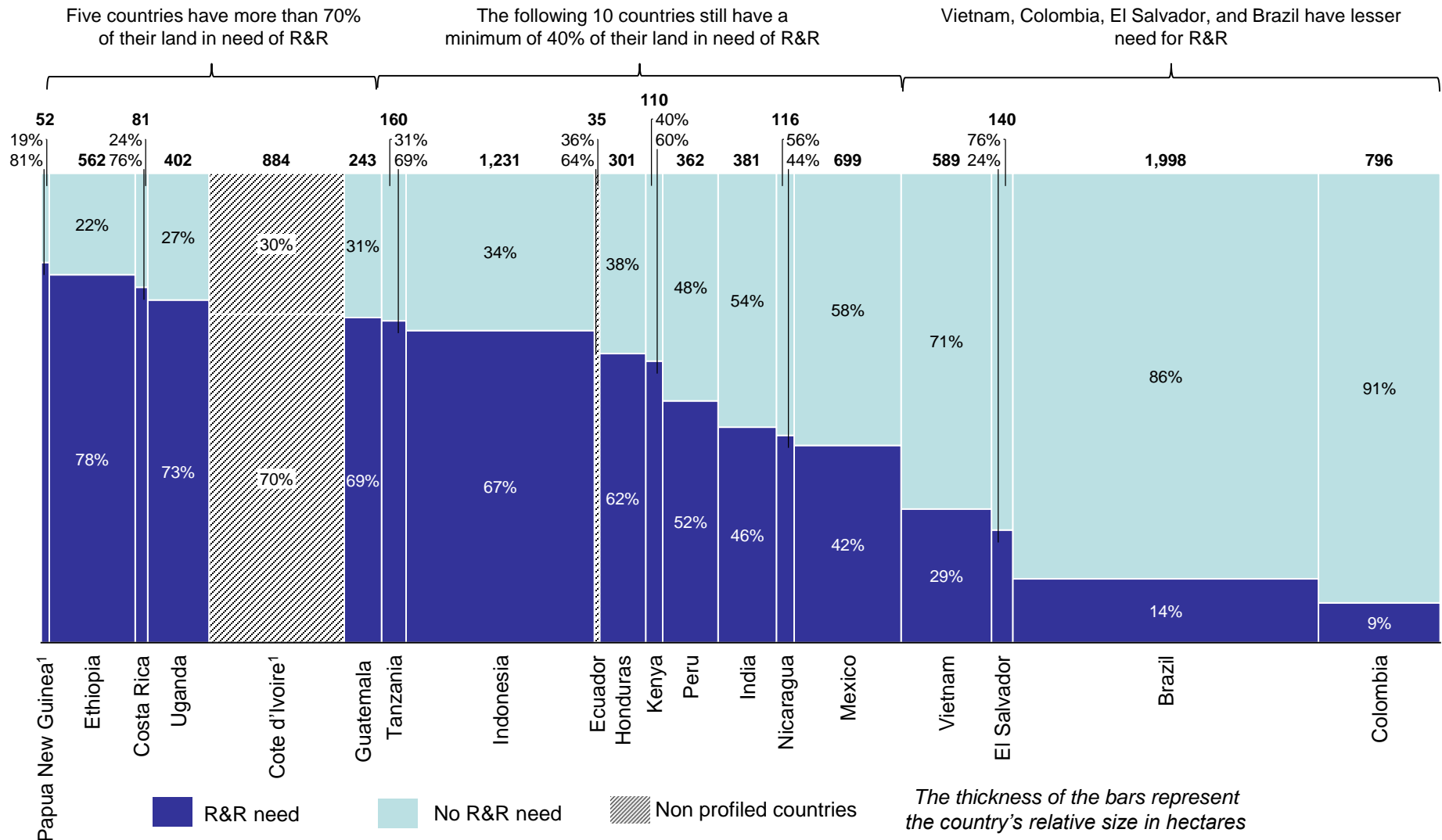


Notes: (1) Globally in this case refers to the sum of the 19 countries covered – which collectively cover ~90% of the global land under coffee in 2014 according to FAO data. (2) The estimates on Côte d'Ivoire and Papua New Guinea are highly uncertain since the underlying data varies significantly. Source: Dalberg analysis

Summary: However, in most countries, the high proportion of SHF need for R&R means over 40% of total coffee land needs R&R...

Estimated proportion of total national land in need of R&R

000's of hectares, % national hectares

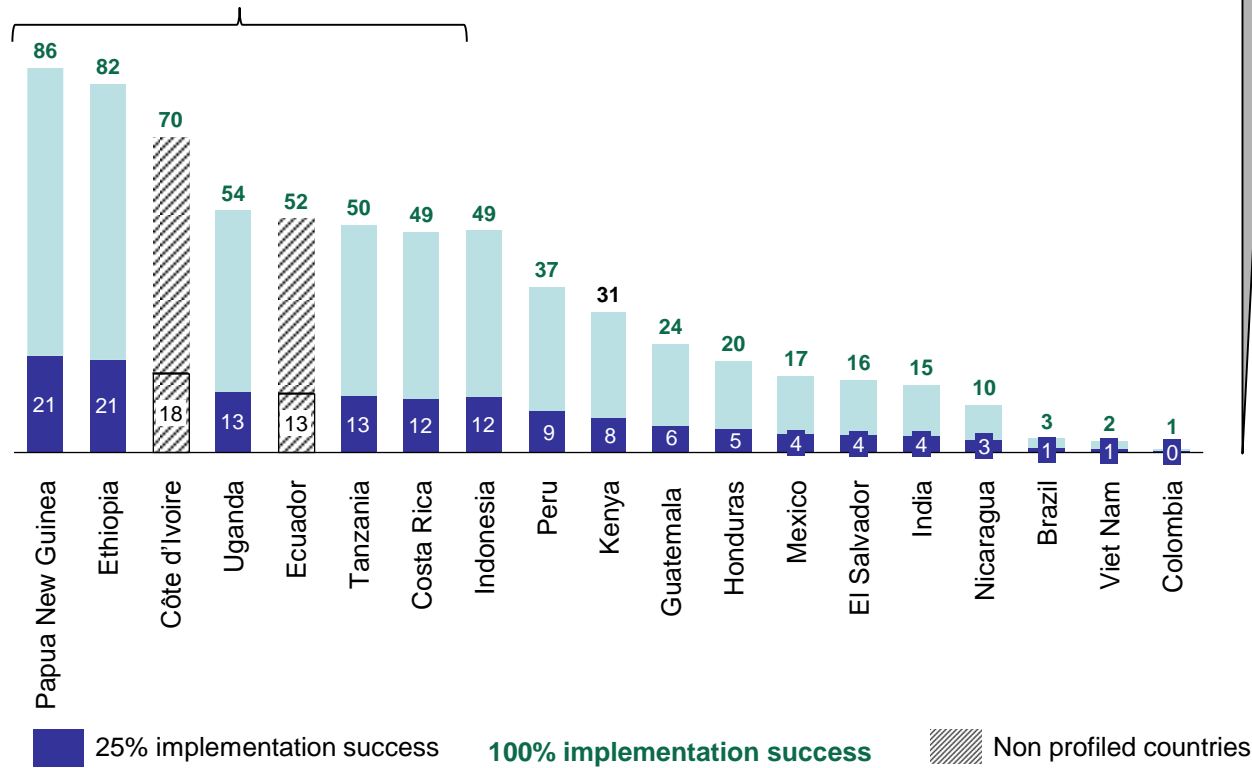


Notes: (1) The estimates on Côte d'Ivoire and Papua New Guinea are highly uncertain since the underlying data varies significantly. Source: Dalberg analysis

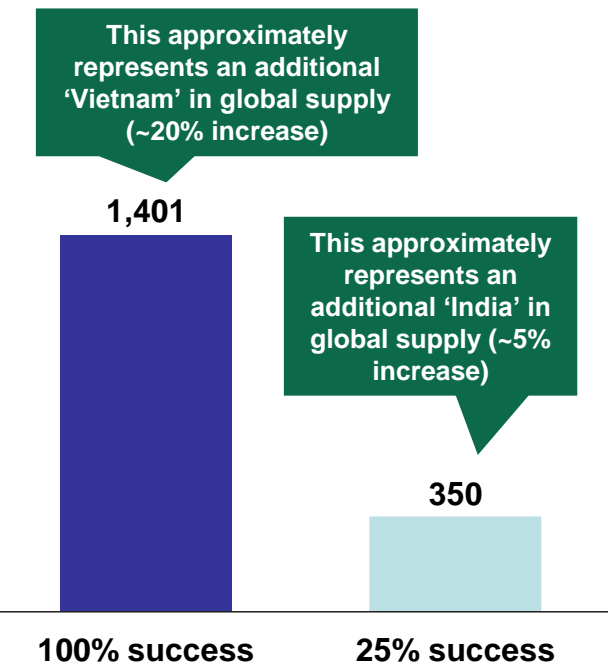
Summary: ...and if R&R is implemented successfully on all land in need, global supply could increase upwards of an additional “Vietnam”

Increase in production from R&R per country – at 25% and 100% success rate¹ % increase in national production

Countries with high need and high proportion of SHFs have the highest potential to significantly expand national supply via R&R



Associated impact on global supply 000's of tons



Notes: (1) These uplifts build on (i) achievable productivity at the national level and (ii) rate of implementation success in R&R programs. The achievable productivity is mostly taken from the GCP studies on economic viability, whereas the 25-100% implementation success rate range illustrates a highly conservative estimate (25% - programs deliver 25% of their potential) and an optimistic estimate (100% - all R&R activities succeed and reach achievable uplift). Note also that these uplifts are conservative national averages and that potential uplifts for specific communities might be much higher. (2) The estimates on Côte d'Ivoire and Papua New Guinea are highly uncertain since the underlying data varies significantly Source: Dalberg analysis

Country profiles

From biggest absolute R&R need to smallest (in hectares)

Indonesia represents around 20% of the global need for R&R alone, given its significant size and large SHF base

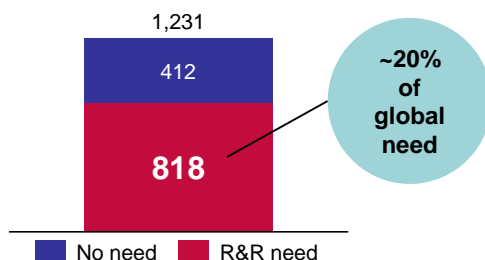


Quick facts: Indonesia is the world's second biggest Robusta producer

Production '000 tons	Production share Global & region	Coffee land '000 hectares	Varieties Arabica-Robusta
644	4th in world 2nd in Asia	1,231	20% A 80% R

R&R need: ~70% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



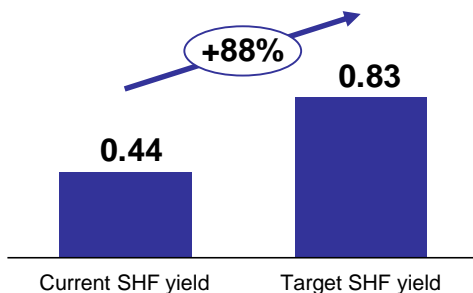
Drivers of R&R need:



R&R need is driven by high age of trees planted in dense areas, and low adoption of good agricultural practices. Most regions in Indonesia are projected to remain suitable for coffee growing in light of climate change

Uplift potential: Significant potential to increase yield and national supply

Current SHF yield & potential uplift¹
Tons per hectare



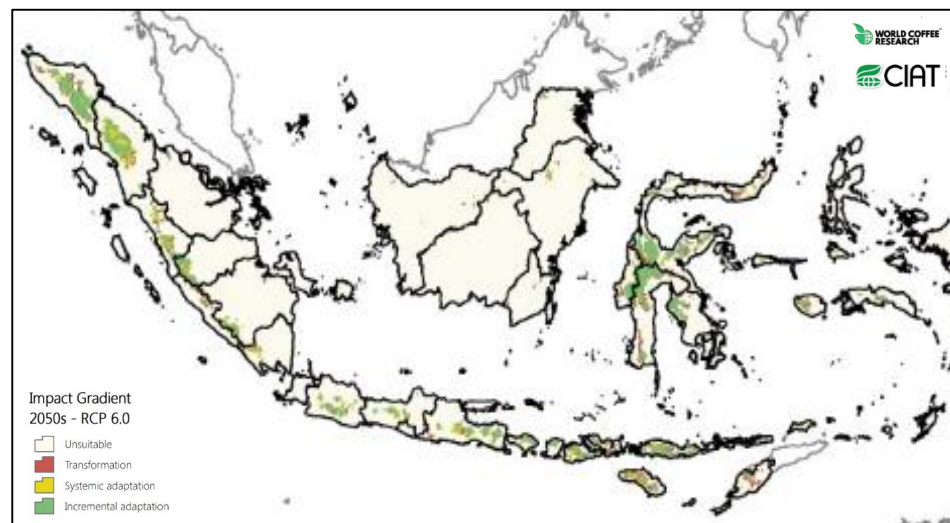
Potential increase in supply

~10-50%

Total national supply could increase ~10-50% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Long-term viability overall looks favorable

Suitability map



- Most regions in Indonesia are likely to remain suitable for coffee growing in the future, though some regions will need to think of systemic adaptation – especially the main coffee growing region, Sumatra

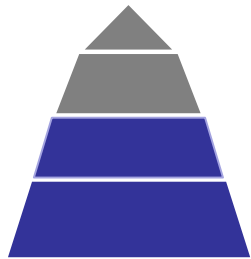
Other viability considerations

- The yield uplift potential is higher for Robusta producers in Sumatra than for other SHFs
- Coffee plantations are heavily exposed to dry weather throughout Southern Sulawesi, Java and Eastern Indonesia

Indonesia is characterized by 1.5 million unorganized SHFs and a liberal and unorganized enabling environment



Farmer segmentation: Most SHFs are at the bottom of the pyramid



National production is dominated by SHFs

The majority of SHFs are either in loose value chains or weakly connected value chains, with unstable links to market. SHF organizations are generally mismanaged and lack capacity

SHFs
'000

1,500-2,000 (~7.5-10% of global SHFs¹)

SHF land
'000 hectares

1169 (~95% of national land) – average farm size is ~1-1.5 hectares

SHF production
'000 tons

515 (~80% of national production)

Assessment of
SHF orgs.

Most farmers are unorganized and coops have little capacity to manage loans and provide technical assistance (TA)

Links to market

Farmers sell their unprocessed coffee to aggregators

Enabling environment for R&R: Liberal and unorganized coffee sector

Political environment



- Coffee share of GDP: N/A [Coffee share of exports: 0.82% (2015)]
- Indonesia has a liberal coffee sector. It is not a strategic priority for the Indonesian government², which mostly supports the sector as part of its commodity export strategy
- SHFs receive some support from the government (e.g. tax exemption on fertilizers)

Availability of inputs



- Only one research institute in Indonesia provides seedlings, but not at commercial volumes
- Some private nurseries provide seedlings, but there is no control over quality
- Low access to nutrition and other inputs

Availability of finance



- SHFs have very limited access to credit from local banks
- Foreign investors experience currency exchange risk when they make loans in local currency

Knowledge availability



- The government does not provide extension services to SHFs
- Some coops provide TA to SHFs, but overall there is limited presence and capacity from coops to provide TA

Examples of R&R programs: Indonesia has been underserved by existing programs to date, and there is need for more engagement

- **FAO and the Coffee and Cocoa Research Institute – Nursery Program** (2016-2030): The program encourages Javanese and Balinese female farmers to manage seed nurseries
- **Kepahiang government - Peremajan Kopi**³ (since 2017): The objective of the program is to renovate 4-5 million trees in the Kepahiang region (Sumatra)

Notes: (1) Assuming a global SHF population of 20 million – estimate on number of farmers is high-level only as numbers vary significantly. (2) The Indonesian government mostly provides support to staple crop sectors, and in particular palm oil. (3) Information on the Peremajan Program is only available in Bahasa and might be incomplete. Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; Sustainable Coffee Program, *Indonesia: a business case for the production of sustainable coffee*, 2014; USDA, *Annual Coffee Report*, 2017; Dalberg Interview

Ethiopia is Africa's biggest producer and has significant R&R need, and potential to increase SHF yields and total national output

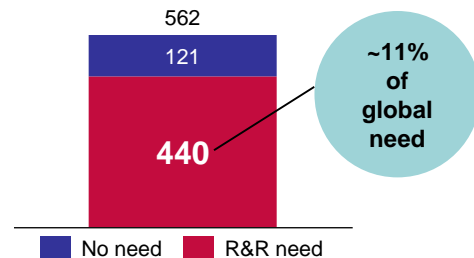


Quick facts: Ethiopia is the biggest African producer

Production '000 tons, 2014	Production share Global & region	Coffee land ¹ '000 hectares, 2014	Varieties Arabica-Robusta
420	5th in world 1st in Africa	562	100% A 0% R

R&R need: ~80% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



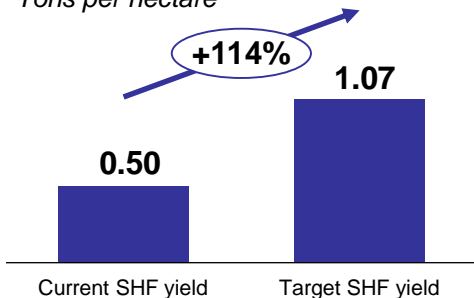
Drivers of R&R need:



Need is primarily driven by old trees (50-70 years in some places) and suboptimal current practices. Climate change is looking to have minimal impact on Ethiopia

Uplift potential: Significant uplift potential given low current SHF yields

Current SHF yield & potential uplift¹
Tons per hectare



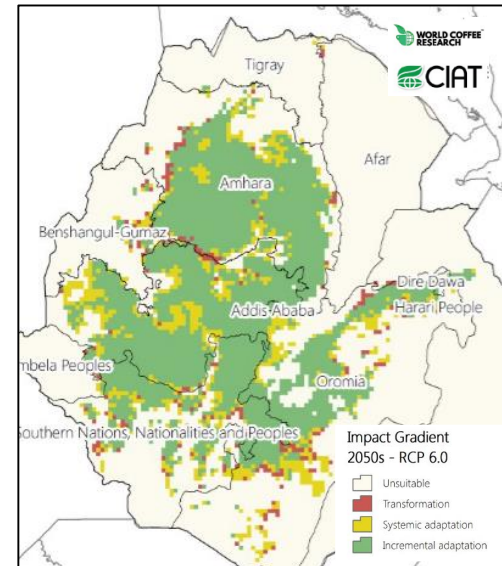
Potential increase in supply

~20-80%

Total national supply could increase ~20-80% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Ethiopia has favorable viability compared to other countries

Suitability map



- Most of Ethiopia's land area for Arabica is in incremental change sites and therefore suitable for future production
- Some areas – scattered throughout the country – are systemic change sites

Other viability considerations

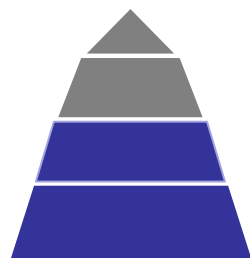
- Farmer share of the export price is around 60% which is lower than other countries. There is potential to increase supply chain efficiency
- Production costs equal ~ USD 190 / ha, compared to ~ USD 500 / ha in Kenya
- *Khat* production (plant chewed by humans for its stimulating effects) is competing with coffee production in many traditional coffee growing areas.
- *Khat* is more drought, disease, and pest resilient than coffee, and can often generate higher income than coffee

Notes: (1) Average yield is calculated as the total SHF production divided by the total SHF land. The potential yield improvement is estimated by GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 114%, and the range reflects a 25-100% R&R success rate. Sources: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; Government of Ethiopia, *Global Transformation Plan II*, 2015; The world Bank, *Credit constraints and farm productivity: Micro-level evidence from smallholder farmers in Ethiopia*, 2017, Ethiopian Agricultural Transformation Agency, *Annual Report*, 2016; Dalberg interviews

Ethiopia has the largest SHF population in the world, which is largely unorganized, and faces a relatively weak enabling environment



Farmer segmentation: Most SHFs are at the bottom of the pyramid



National production is dominated by SHFs

The majority of SHFs are either in loose value chains or weakly connected value chains, with unstable links to market. SHF organizations are generally mismanaged and lack capacity

SHFs
'000

2,000- 2,500 - 10% - 12.5% of global SHFs¹

SHF land
'000 hectares

550 (~98% of national land) – average farm size ~0.5-2 hectares

SHF production
'000 tons

380 (~90% of national production)

Assessment of
SHF orgs.

Nascent coop sector that gradually improves – ~10% of SHFs are linked to coops

Links to market

A majority of SHFs have loose and weak links to market

Enabling environment for R&R: Relatively weak enabling environment

Political environment



- Coffee share of GDP: 1.1% (2011)
- Sector institutionalization is improving (re-establishment of the Coffee and Tea Marketing Authority in 2016, implementation of the Coffee & Tea Research Institute)
- Several encouraging reforms under implementation, including the Growth and Transformation Plan II to increase coffee productivity and double coffee production by 2020², and the reform of the Ethiopian Coffee Exchange to boost exports of specialty coffee

Availability of inputs



- Coffee research stations provide certified seeds, but not at commercial volumes, and distribution is limited to areas nearby
- Privately produced seeds are not controlled and registered and producers complain about high mortality rates of seeds

Availability of finance



- SHFs are highly credit constrained. Roughly 70% of SHFs complain about their inability to access credit, and 14% complain about the high cost of credit

Knowledge availability



- Few SHFs receive TA. Cooperatives usually do not have the financial capacity to finance TA, and public extension services are limited
- Adoption of GAP is extremely low. The Coffee Initiative found a baseline adoption of GAP at 6%, compared to 34% in Kenya and 40% in Rwanda

Examples of R&R programs: Past R&R programs have focused on increasing adoption of GAP and building SHF org. capacity

- **TechnoServe - The Coffee Initiative** (2008-2017): Technoserve trained (via Farmer Field Schools) roughly 80,000 Ethiopian SHFs on GAP and rehabilitation practices

Notes: (1) Assuming a global SHF population of 20 million – estimates for Ethiopian SHFs vary widely; (2) This would bring Ethiopian production at the level of the Brazilian production. This objective is unlikely to be met in such a short timeframe, but it gives positive signals to the coffee sector. Sources: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; Government of Ethiopia, *Global Transformation Plan II*, 2015; The world Bank, *Credit constraints and farm productivity: Micro-level evidence from smallholder farmers in Ethiopia*, 2017, Ethiopian Agricultural Transformation Agency, *Annual Report*, 2016; Dalberg interviews

Mexico is a major Arabica producer with high R&R need due to ageing trees and exposure to *La Roya*

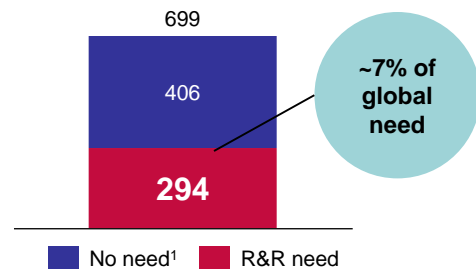


Quick facts: Mexico is an important global producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
215	11 th in world 1 st in North America	699	~ 95% A ~ 5%R

R&R need: ~40% of land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



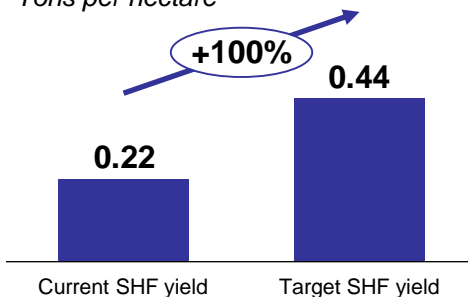
Drivers of R&R need:



Need is driven by the age of trees and exposure to disease (~15% of coffee land was affected by *La Roya*), and to a lesser extent by climate change

Uplift potential: Significant uplift potential given low current SHF yields

Current SHF yield & potential uplift¹
Tons per hectare



Potential increase in supply

~5-15%

Total national supply could increase ~5-15% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Mexican production is partially exposed to climate change

Suitability map



- Four out of five major coffee producing states, Chiapas, Veracruz, Oaxaca, Guerrero, could be increasingly exposed to climate change risk
- Chiapas is forecasted to be severely affected in low land coffee growing areas

Other viability considerations

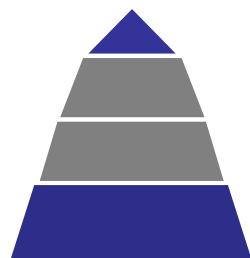
- Circa 70% of SHFs are considered poor. Coffee regions suffer from high poverty rates, and are underserved by basic infrastructure
- A minority of SHFs practice intercropping. The majority rely exclusively on coffee
- Most SHFs produce coffee unmechanized

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift is based on an internal estimate based on other mixed countries and current yields. (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 86%, and the range reflects a 25-100% R&R success rate Sources: FAO Statistics database; ICO statistics; Hector Manuel Robles Berlanga, *Los Productores de Café en México: Problemática y Ejercicio del Presupuesto*, Mexican Rural Development Research Reports, 2011; SAGARPA, *Plan Integral de Atención al Café (PIAC)*, 2015; FIRA, *Panorama Agroalimentario*, 2016; Dalberg interviews

Most Mexican SHFs are not organized in SHF organizations, though several R&R programs have been implemented in the country



Farmer segmentation: Most SHFs are at the bottom of the pyramid



National production is split between large and medium farmers and SHFs

More than 85% of farmers are SHFs, but they own less than 50% of the coffee growing areas. They are typically disconnected

SHFs
'000

230 – ~2.5% of global SHFs¹

SHF land
'000 hectares

420 (~60% of national land) – farm size typically ~0.5 hectares

SHF production
'000 tons

85 (~40% of national production)

Assessment of
SHF orgs.

Coops usually have low capacity to provide TA - ~25% of SHFs are in a coop

Links to market

A majority of SHFs are linked to the market through “coyotes”, lenders that charge extremely high interest rates

Enabling environment for R&R: improving political environment

Political
environment



Availability
of inputs



Availability
of finance



Knowledge
availability



- Coffee share of GDP: N/A [Coffee share of exports: 0.1% (2015)]
- Mexico does not have dedicated coffee institutions. The coffee policy is managed by the Secretary of Agriculture (SAGARPA)
- Since 2015, SAGARPA has been leading a significant plan (integrated program for Coffee) to support and reshape the coffee sector. Coffee has become a national priority
- In 2015, SAGARPA led a seed inventory analysis and acknowledged the lack of locally supplied seeds
- PIAC provides support to private nursery and certification institutions, with the purpose of reaching commercial volumes of locally produced seeds
- SHFs are highly credit constrained. In 2011, about 4% of the SHFs had access to credit
- The Trust Fund for Rural Development (FIRA) lends specific credit lines to local finance institutions to increase the volume of loans they provide to SHFs
- Coops have little capacity to provide TA
- SAGARPA works with a network of 400 agronomists who speak indigenous languages and visit SHFs. Yet, coverage of public extension services remain insufficient

Examples of R&R programs: Past R&R programs have focused on renovating areas affected by La Roya

- **SAGARPA – Integrated Program for Coffee, PIAC** (2015 – 2019) – R&R is one of the PIAC components. PIAC aims to develop certified nurseries to supply producers with quality disease-resistant plants, to renovate coffee plantations, and to provide maintenance and rehabilitation of existing crops
- **Root Capital – Coffee Farmer Resilience Initiative** (since 2013): Root Capital lent USD 1.1 million to farmer organizations in Mexico and trained them to deliver loans to their members
- **Neumann Kaffee Gruppe – Por Mas Café** (since 2014) – NKG's exporting company in Mexico partners with a local bank to provide loans for renovation to farmers in its supply chain

Uganda is an important global producer with significant uplift potential due to a high need for R&R and low current SHF yields

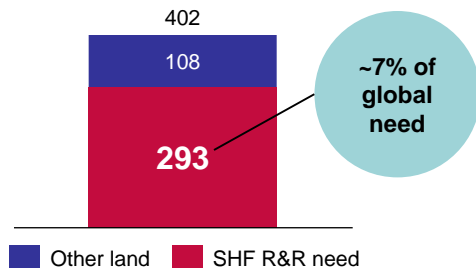


Quick facts: Uganda is Africa's 2nd biggest producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
220	10th in world 2nd in Africa	402	~30% A ~70% R

R&R need: ~75% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



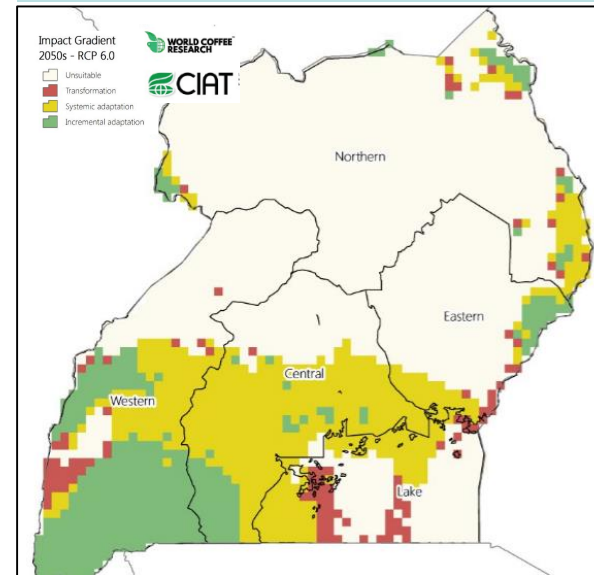
Drivers of R&R need:



Coffee trees in Uganda are on average 50 years old. Most of them would require renovation or intensive rehabilitation alongside with GAP.

Viability: Climate change could significantly impact Arabica

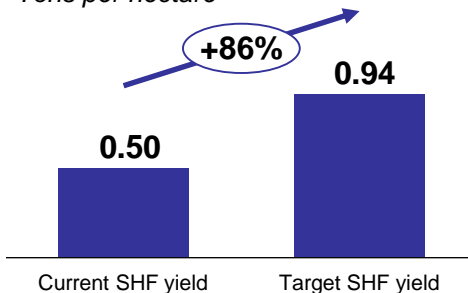
Suitability map



- Arabica production in southern Uganda is looking to be heavily impacted by climate change

Other viability considerations

Current SHF yield & potential uplift¹
Tons per hectare



Potential increase in supply

~15-55%

Total national supply could increase ~15-55% if R&R and GAP is implemented on all SHF land in need of R&R²

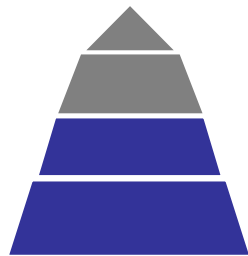
- Coffee is the main cash crop in Uganda, contributing almost a third of foreign export earnings
- There is growing domestic consumption which might increase demand and need for localized processing
- High competition between traders promotes the trading and sale of poor quality coffee, with few incentives for the farmers to invest in improvement of the quality of their product. Price premiums for quality would incentivize farmers to invest

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift comes from the GCP study on Uganda: GCP, *Uganda: GCP: Economic Viability of Coffee farming*, 2017 – this study cites an average SHF yield of 0.625 tons/hectare; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 86%, and the range reflects a 25-100% R&R success rate. Sources: FAOstat, *Coffee production and land under coffee*, 2014; ICO production statistics; Deloitte, *Uganda Economic Outlook 2016: The story behind the numbers*, 2016

Uganda is home to a significant share of global SHFs that mostly have loose or weak linkages to market, and availability of R&R components is lacking



Farmer segmentation: Most SHFs are at the bottom of the pyramid



National production is dominated by SHFs

SHFs are predominately in loose value chains or weakly connected value chains, with unstable links to market. There are few (well functioning) aggregation points for farmers

SHFs
'000

1,161-1,700 (~6-9% of global SHFs¹)

SHF land
'000 hectares

390 (~95% of national land) – average farm size ~0.2-0.4 ha)

SHF production
'000 tons

200 (~90% of national production)

Assessment of
SHF orgs.

Coops are few and far in between and typically have low capacity

Links to market

Sector is dominated by private sector agents and brokers at the aggregator level

Enabling environment for R&R: Though government is supportive, access to R&R components is lacking

Political environment



- Coffee share of GDP: 1.8% (2016)²
- The Uganda Coffee Development Authority (UCDA), the industry regulator, launched a National Coffee Strategy meant to increase export revenue from USD 0.5 B in 2014/15 to USD 2.5 B by 2040

Availability of inputs



- Generally low availability of inputs and SHFs are reported to not apply the correct amount of nutrition to their trees
- UCDA launched a Robusta coffee nursery seedling multiplication program. UCDA worked with 132 private nurseries across 14 districts to improve their performance. The level of success varies by nursery

Availability of finance



- Low availability
- There is little local experience with financing R&R and even finance for inputs and other ongoing production costs are limited for most farmers

Knowledge availability



- Low adoption of GAP and limited current availability of TA
- The Agricultural Sector Strategic Plan aims to train extension service workers across country, but limited funding has been provided so far

Examples of R&R programs: No direct R&R programs were observed, but HRNS has been working on systemic capacity building

- **HRNS – Building Coffee Farmers' Alliances in Uganda (2009-2013):** The project sought to improve livelihoods of coffee SHF through improved coffee production and increased revenues. The first step was to aggregate producers into organized groups. The project also created the apex organization "Uganda Coffee Farmers Alliance (UCFA)".

There is not a strong case for renovation in Brazil, but unmechanized SHFs could benefit from rehabilitation

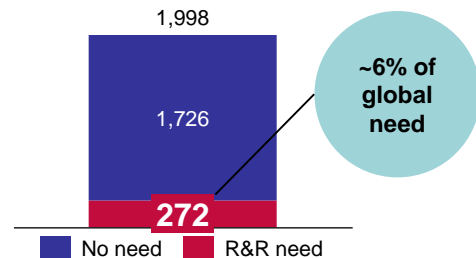


Quick facts: Brazil is the world's largest coffee producer

Production '000 tons	Production share Global & region	Coffee land '000 hectares	Varieties Arabica-Robusta
2,804	1st in world	1,998	90% A 10% R

R&R need: ~20% of total land is in need of R&R

SHF land in R&R need out of all land '000 hectares



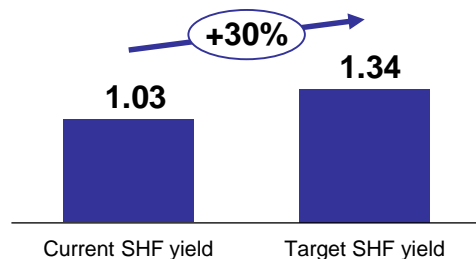
Drivers of R&R need:



There is not a significant case for renovation since trees are relatively young. Rehabilitation need is driven by suboptimal practices and climate change

Uplift potential: Low potential uplift given the moderate SHF production

Current SHF yield & potential uplift¹ Tons per hectare

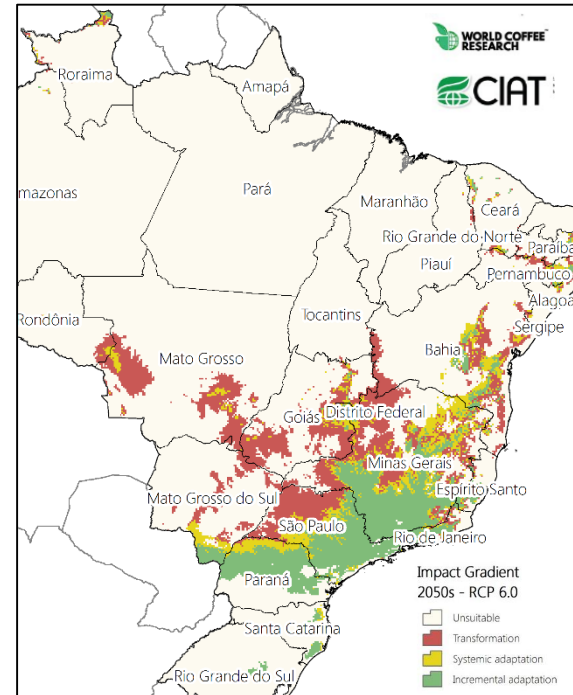


Potential increase in supply

<5%
Total national supply could increase ~1-3% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Climate change could significantly impact Brazil

Suitability map



- Brazil could potentially be severely affected by climate change since it has a lot of low-land coffee
- Matto Grosso and Goiás regions are potentially the most exposed
- Coffee in the Southern most part of Brazil looks to be less affected

Other viability considerations

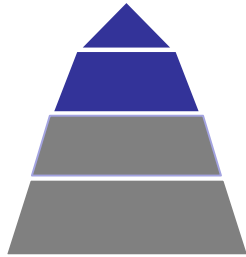
- The 30% potential yield increase applies to unmechanized SHFs. Uplift potential is likely to be lower for other SHFs. Unmechanized farms under 10 ha represent ~30% of total farms, mostly concentrated in the Minas Gerais region
- Production costs have increased over the past years
- Preservation of soils and ecosystems, damaged by the intensive use of fertilizers, is a key consideration for future suitability of coffee

Notes: (1) Average yield is calculated as the total SHF production divided by the total SHF land. The potential yield improvement is estimated by GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 30%, and the range reflects a 25-100% R&R success rate Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; USDA, *Annual Coffee Report*, 2017; ACOB, *Producer Training Project*, 2017; Sustainable Coffee Program, *Brazil: a business case for the production of sustainable coffee*, 2014; Ministerio da Agricultura, Pecuaria e Abastecimento, *Public policies and the financing of coffee production in Brazil (Presentation for the ICO)*, 2010; Dalberg Interview

Brazil's production is dominated by medium and large producers who implement R&R on a rolling basis



Farmer segmentation: highest number and share of large farms



National production is split between SHFs and large and medium farmers

Brazil has the highest number and share of large and medium farmers in the world. Most of the SHFs are organized into cooperatives or have links to markets through traders.

SHFs
'000

270 – 1.5% of global SHFs

SHF land
'000 hectares

1,360 (~70% of national land) – average farm size ~5 hectares

SHF production
'000 tons

1,400 (~50% of national production)

Assessment of
SHF orgs.

Brazil has powerful coops though they are not dedicated solely to SHFs: ~10% of SHFs are linked to coops

Links to market

Many SHFs are linked to the market through traders

Enabling environment for R&R: Strong and well performing sector

Political environment



- Coffee share of GDP: 0.35% (2011)
- Coffee sector is a strategic priority for the government. The sector is well organized, including by the well-established Brazilian Coffee Industry Association (ABIC)
- The government has previously subsidized coffee farmers and pushed for a agronomic model based on intensive practices and use of fertilizers

Availability of inputs



- Most of the seedlings are locally produced. Research institutions (sometimes in partnership with private companies) develop rust-resistant varieties
- Seedlings are produced at commercial volumes by private nurseries

Availability of finance



- Credit for R&R in the coffee sector is easily available through several sources (financial institutions¹, rural savings², Funcafe³)
- Observers worry that, in the aftermath of the 2015 economic crisis, subsidies to SHFs may be cut off

Knowledge availability



- Public extension services and private rural extension services are available in Brazil. Some cooperatives provide TA to their members
- Observers complain about the lack of climate adaptation knowledge and the over usage of fertilizers by SHFs

Examples of R&R programs: Past R&R programs mostly focused on climate change mitigation and rehabilitation

- **HRNS – Coffee and Climate** (2010-2019): HRNS provides TA to SHF to adapt to climate change. The program targets several countries, including Brazil
- **ACOB – Producer Training Program** (2014 – 2017): ACOB trained 2705 coffee SHF on climate-suitable practices, including GAP and rehabilitation practices

Notes: (1) Financial institutions must invest 25% of demand deposits in rural credit. These resources are known as “compulsory resources”. In 2010, compulsory resources represented more than 50% of rural financing. (2) 65% of the value of rural savings deposits must be kept by financial institutions. (3) Coffee Economy Defense Fund: national coffee trust fund dedicated to the financing of the coffee sector. Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; USDA, *Annual Coffee Report*, 2017; ACOB, *Producer Training Project*, 2017; Sustainable Coffee Program, *Brazil: a business case for the production of sustainable coffee*, 2014; Ministerio da Agricultura, Pecuaria e Abastecimento, *Public policies and the financing of coffee production in Brazil* (Presentation for the ICO), 2010; Dalberg Interview

Peru is a major regional producer that has significant uplift potential due to high R&R need in areas affected by *La Roya*

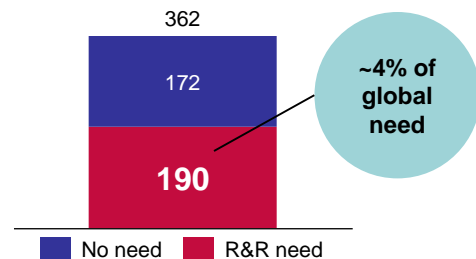


Quick facts: Peru is the 4th biggest Latin American producer

Production '000 tons, 2014	Production share Global & region	Coffee land ¹ '000 hectares, 2014	Varieties Arabica-Robusta
222	9th in world 4th in LA	362	~100% A 0% R

R&R need: ~70% of land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



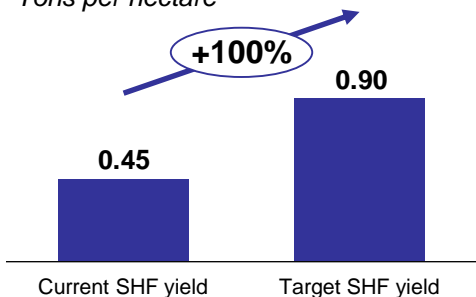
Drivers of R&R need:



Need is primarily driven by old trees and exposure to disease (*La Roya* affected ~50% of coffee growing areas), and to a lesser extent by climate change

Uplift potential: Significant uplift potential given low current SHF yields

Current SHF yield & potential uplift¹
Tons per hectare



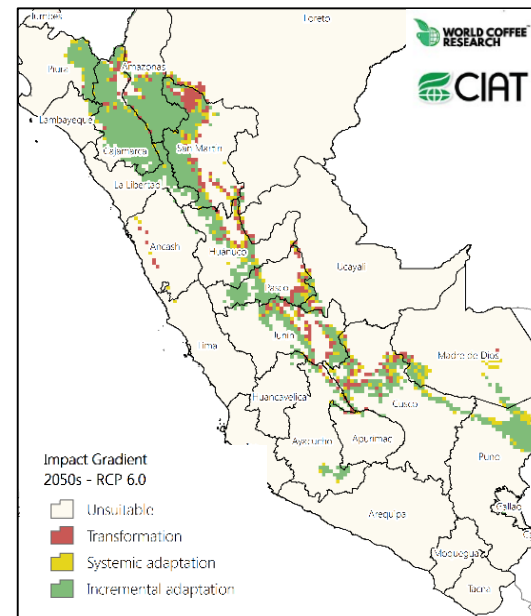
Potential increase in supply

~10-40%

Total national supply could increase ~10-40% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: climate change could affect lowest altitudes areas

Suitability map



- Overall, Peru is forecast to be relatively mildly affected by climate change for coffee production
- Coffee growing area in low altitudes are exposed to climate change risk
- Coffee growing areas in the North East look to be hardest affected

Other viability considerations

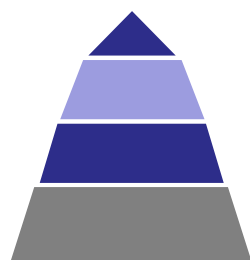
- Peru is the world's leading exporter of organic coffee. SHFs, who are mostly unable to pay for fertilizers, are the main producers of organic coffee
- A growing number of SHFs seek out specialized certification schemes to access foreign specialty markets and earn premiums
- The coffee sector generates more than 850,000 jobs in remote and impoverished areas of the country. The government promotes coffee production as an alternative crop to coca leaf cultivation

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift comes from the GCP study on Peru: GCP, *Peru: GCP: Economic Viability of Coffee farming*, 2017; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 100%, and the range reflects a 25-100% R&R success rate. Sources: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; USDA, *Annual Coffee Report*, 2017; ; Federacion Internacional de Productores Agropecuarios, *Las cooperativas de Café en Peru: experiencias y perspectivas*, 2009; Ministerio de Agricultura y Riego; *Plan Nacional de Renovación de cafetales*, 2014; Dalberg interviews

About 60% of farmers in Peru are SHFs, some of which have benefitted from renovation programs following the *La Roya* outbreak



Farmer segmentation: Production is split



National production is split between SHFs and large and medium farmers

About 59% of farmers are SHFs (30% in tight value chains and a majority in loose value chains). 39% are medium farmers (between 5 and 50 hectares) and 2% hold land larger than 50 hectares

SHFs
'000

132 ~1% of global SHFs¹

SHF land
'000 hectares

260 (~70% of national land) – farm size typically ~2 hectares

SHF production
'000 tons

110 (~70% of national production)

Assessment of
SHF orgs.

Coops obtain better prices, improve post-harvest processing and marketing strategies of SHFs – ~30% of SHFs are linked to coops

Links to market

Non organized farmers are linked to markets by traders

Enabling environment for R&R: Government support, but capacity for R&R is low

Political environment



- Coffee share of GDP: N/A [Coffee share of exports: 2.6% (2011)]
- The government of Peru has recently defined the coffee sector as a national priority.
- 2013: Implementation of a national renovation program with a USD 70 million budget

Availability of inputs



- The national renovation plan supports development of nurseries
- Seeds produced in private seedling nurseries are controlled and certified by the National Institute of Agricultural Innovation (INIA)

Availability of finance



- SHFs in loose value chains have limited access to finance
- Many SHFs complain about credit terms (8 year tenor, 10% interest rate) from AgroBanco, though these are more favorable compared to local financial institutions

Knowledge availability



- Cooperatives have little capacity and experience in providing high quality TA
- The Junta Nacional del Café acts as a service provider, but has limited field presence

Examples of R&R programs: Past R&R programs have focused on renovating areas affected by *La Roya*

- **Root Capital – Coffee Farmer Resilience Initiative** (since 2013): Root Capital lent USD 2.7 million to farmer organizations in Peru and trained them to deliver loans to their members
- **Government of Peru – Coffee renovation program** (2012-2017): The Peruvian government channeled concessional loans to SHFs to encourage the renovation of 80,000 hectares

Honduras is a major regional producer with significant R&R need due to old trees and a recent *La Roya* outbreak

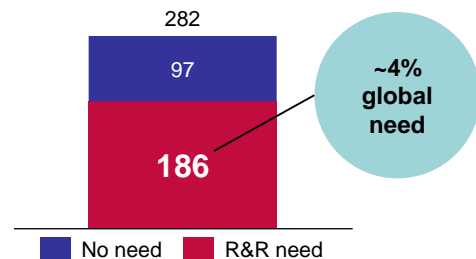


Quick facts: Honduras is the 3rd largest Latin America producer

Production '000 tons	Production share Global & region	Coffee land '000 hectares	Varieties Arabica-Robusta
282	6th in world 3rd in LA	301	100% A 0% R

R&R need: ~70% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



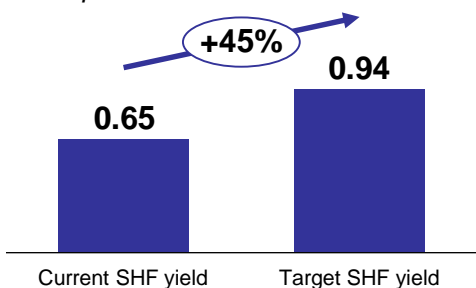
Drivers of R&R need:



Need is primarily driven by old trees and exposure to disease (*La Roya* affected ~25% of coffee growing areas). Climate change also has the potential to negatively affect Honduras – especially in the central region

Uplift potential: Some potential for SHFs, but less impact on total supply

Current SHF yield & potential uplift¹
Tons per hectare



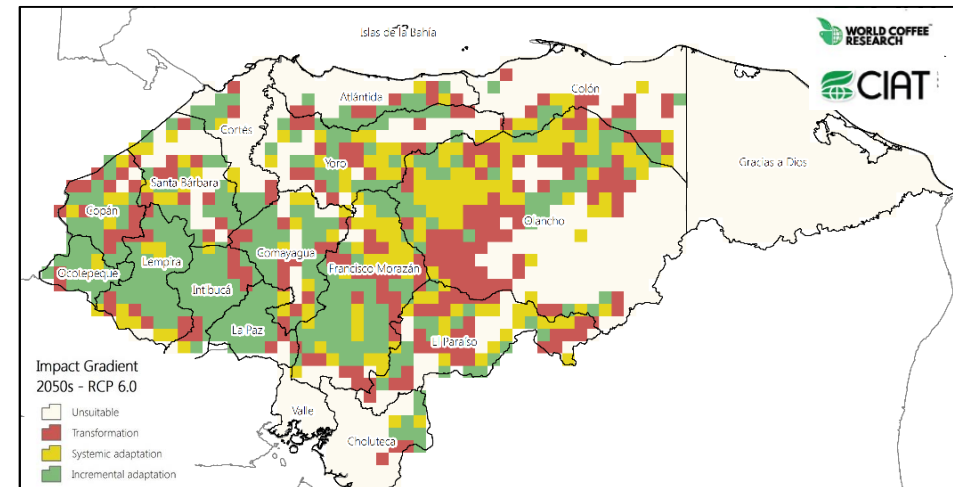
Potential increase in supply

~5-20%

Total national supply could increase ~5-25% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Climate change could severely impact Honduras

Suitability map



- The climate change projections indicate that Honduras could be severely affected by increasing temperatures
- Especially in central Honduras, significant portions of land could become unsuitable for Arabica coffee in the future

Other viability considerations

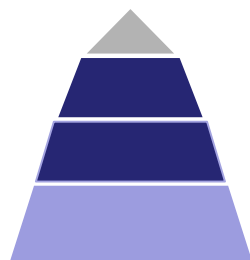
- Farmer share of the export price is around 75%, with local intermediaries playing a significant role in the value chain
- Honduras is a growing player in the field of specialty coffee. Honduras could meet part of the high quality Arabica coffee demand, especially for the US market
- Labor cost is on average USD 845/ha, about half the labor cost in Colombia

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift comes from the GCP study on Honduras: GCP, *Honduras: GCP: Economic Viability of Coffee farming*, 2017. (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 45%, and the range reflects a 25-100% R&R success rate Sources: Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; Root Capital, *Learning Report: the CFIR*, 2016; USDA, *Annual Coffee Report*, 2017; IHCAFE, *Programa de Asistencia al Pequeño Productor*, 2017; IHCAFE, *El sector café de Honduras: avances, institucionalidades and desafíos*, 2017; Dalberg Interview

Honduras' relatively well-organized coffee institutions have led several renovation programs targeting SHFs



SHF segmentation: Most SHFs are in tight and loose value chains



SHFs
'000

96 (includes SHFs <7hectares – 2% of global SHFs¹)

SHF land
'000 hectares

265 (~90% of national land) – farm size typically <3 hectares

SHF production
'000 tons

181 (~65% of national production)

Assessment of
SHF orgs.

All coops are registered by IHCAFE¹ ~40% of SHFs are linked to coops. Coops have low capacity to deliver TA.

Links to market

SHFs are registered by IHCAFE

Majority of national production comes from SHFs, though less so than other countries

The majority of SHFs are either in tight or loose value chains. IHCAFE reaches most of the SHFs.

Enabling environment for R&R: Relatively well organized coffee sector

Political environment



- Coffee share of GDP: 3.7% (2012)
- Well organized sector since 2000: privatization of IHCAFE and creation of the regulatory authority (National Council of Coffee, NCC)
- In 2004, a producer savings trust fund was established to help improve farm productivity. The funds are partly used to finance R&R²

Availability of inputs



- IHCAFE produces seeds, but does not have capacity to produce at commercial volumes
- Many farmers produce their own seeds that are typically of low quality
- Seeds may be imported from Nicaragua, but the certification process is slow

Availability of finance



- Low access to commercial bank loans for SHFs
- Several R&R programs enable SHFs to access grants or long-term finance at concessional rates

Knowledge availability



- Coffee institutions provide extension services at national, regional, and district level. However, these public extension services do not currently meet the demand and need of SHFs
- Some cooperatives provide TA, though many do not

Examples of R&R programs: Past R&R programs have focused on providing access to long-term concessional finance for renovation

- **IHCAFE – Programa de Apoyo al Pequeno Productor** and **Programa de Emergencia al Pequeno Productor** (since 2007): IHCAFE and the government provided highly concessional loans, technical assistance, and inputs to the least productive SHFs affected by *La Roya* to renovate their lands
- **Root Capital – Coffee Farmer Resilience Initiative** (since 2013): Root Capital lent USD 1.5 million to farmer organizations in Honduras and trained them to deliver loans to their members
- **Grupo Caldega - Programa de Produccion sostenible de Café** (2015-2020): The purpose of the program is to renovate 1 million trees and to provide TA to 50,000 SHFs

Notes: (1) Insitituo Hondunero del Café; (2) The collection mechanism of the coffee producer savings fund is through a tax of USD 13.25/quintal exported. Of this sum, USD 9 is used for the Coffee Trust Fund (Fondo Cafetero Nacional, FNC) to repay the loans helps by banks and used by producers, and to pay IHCAFE for inputs sold to producers. Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; Root Capital, *Learning Report: the CFIR*, 2016; USDA, *Annual Coffee Report*, 2017; IHCAFE, *Programa de Asistencia al Pequeno Productor*, 2017; IHCAFE, *El sector café de Honduras: avances, institucionalidades and desafios*, 2017; Dalberg Interview

India is a significant global and regional producer, but has less potential for increasing national supply since SHFs drive only 60% of national production



Quick facts: India is Asia's second biggest producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
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305

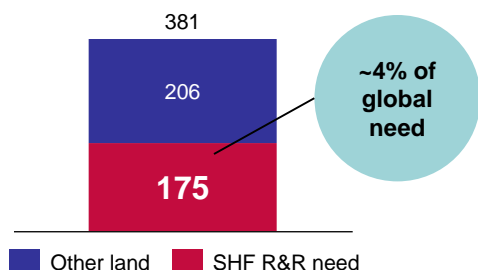
**7th in world
2nd in Asia**

381

**~60% A
~40% R**

R&R need: ~45% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



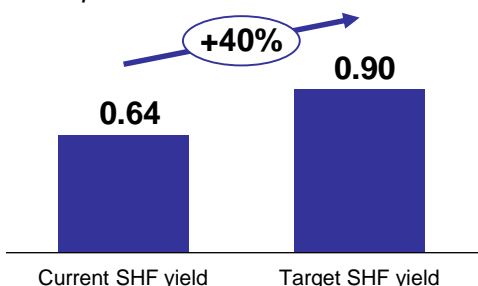
Drivers of R&R need:



~50% of trees have passed peak productivity and ~40% of Arabica trees are damaged by White Stem Borer. ~15-20% of low land areas could be at risk of climate change. Bad practices are less of an issue

Uplift potential: Some potential for SHFs, though limited national impact

Current SHF yield & potential uplift¹
Tons per hectare



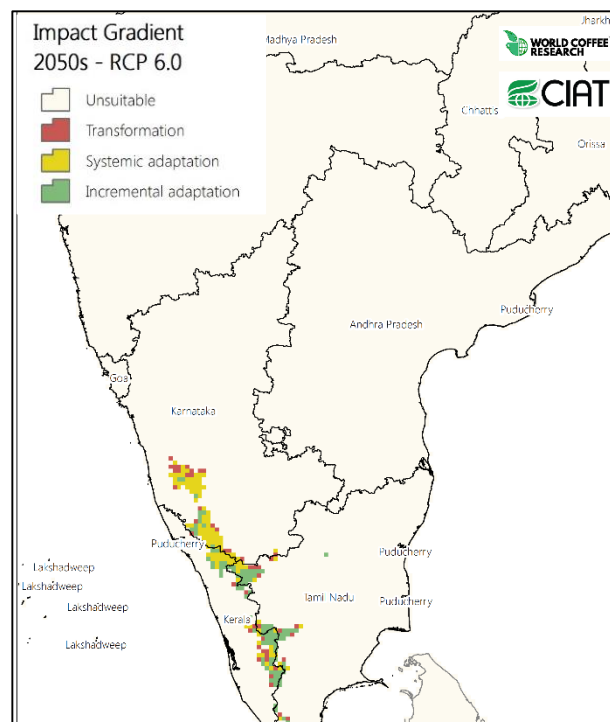
Potential increase in supply

~5-15%

Total national supply could increase ~5-15% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Climate change could impact some areas of India

Suitability map



- Karnataka is the region that looks to be most severely affected by climate change
- There are few areas that are indicated to be in transformative need – but systemic adaptation could be needed in several places

Other viability considerations

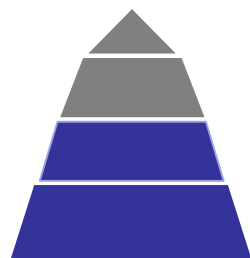
- There are no government subsidies for coffee
- Interviews indicated that outlook for Robusta might be better than for Arabica, since Arabica has been badly hit by White Stem Borer disease
- India has started to position itself for speciality coffee markets

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift is based on an internal estimate based on other mixed countries and current yields– this study cites an average SHF yield of 0.625 tons/hectare; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 40%, and the range reflects a 25-100% R&R success rate. Sources: FAOstat, *Coffee production and land under coffee*, 2014; ICO production statistics; USDA, *Coffee Annual: India*, 2017; Indian Coffee Board, *Annual Report*, 2016; Dalberg interviews

Indian SHFs produce the majority of national supply, though they are less dominant here than in other countries



Farmer segmentation: Most SHFs are at the bottom of the pyramid



The majority of national production comes from SHFs, but less so than other countries

SHFs are predominately in loose value chains or disconnected value chains, with weak and erratic links to market. There are few (well functioning) aggregation points for farmers

SHFs
'000

218-520 (~1-2.5% of global SHFs)¹

SHF land
'000 hectares

286 (~75% of national land) – average farm size ~1-2 ha)

SHF production
'000 tons

183 (~60% of national production)

Assessment of
SHF orgs.

No aggregation points and SHF orgs. except for non-traditional growing belts

Links to market

SHFs typically sell their coffee via middlemen

Enabling environment for R&R: Access to finance is the biggest problem

Political environment



- Coffee share of GDP: N/A [Coffee share of exports: 0.2% (2015)]
- The Coffee Board is implementing the “XII Plan Scheme: Integrated coffee Development Project” (2012-2017) with supportive measures including rainfall insurance for SHFs and subsidies for farm mechanization, though the success of the plan is unclear

Availability of inputs



- There are several private nurseries in India which are owned by farmers themselves, or professional groups, and which meet current demand

Availability of finance



- SHFs are highly credit constrained
- Few SHFs are organized into credit savings groups and thus cannot access microfinance funds

Knowledge availability



- Low adoption of GAP and limited current availability TA
- The Agricultural Sector Strategic Plan aims to train extension service workers across the country, but there is limited funding so far

Examples of R&R programs: Despite its size and significance, few programs have been observed in India

- **Indian Coffee Board – Renovation of Traditional Areas** (since 2015): Component of the XII Plan Scheme. The purpose of the program is to renovate more than 3000 hectares of coffee land in traditional coffee growing areas

Guatemala has significant need for R&R since it has not yet recovered from a recent *La Roya* outbreak

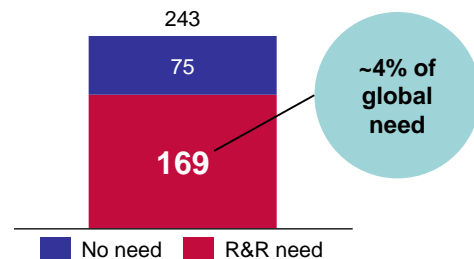


Quick facts: Guatemala is the 5th biggest Latin America producer

Production '000 tons	Production share Global & region	Coffee land '000 hectares	Varieties Arabica-Robusta
232	11 th in world 5 th in LA	243	90% A 10% R

R&R need: ~70% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



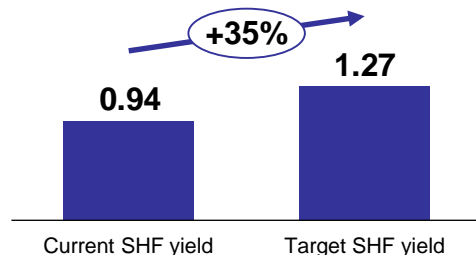
Drivers of R&R need:



Need is primarily driven by old trees and exposure to disease (*La Roya* affected ~70% of coffee growing areas), and to a lesser extent climate change

Uplift potential: Moderate uplift potential on national supply

Current SHF yield & potential uplift¹
Tons per hectare



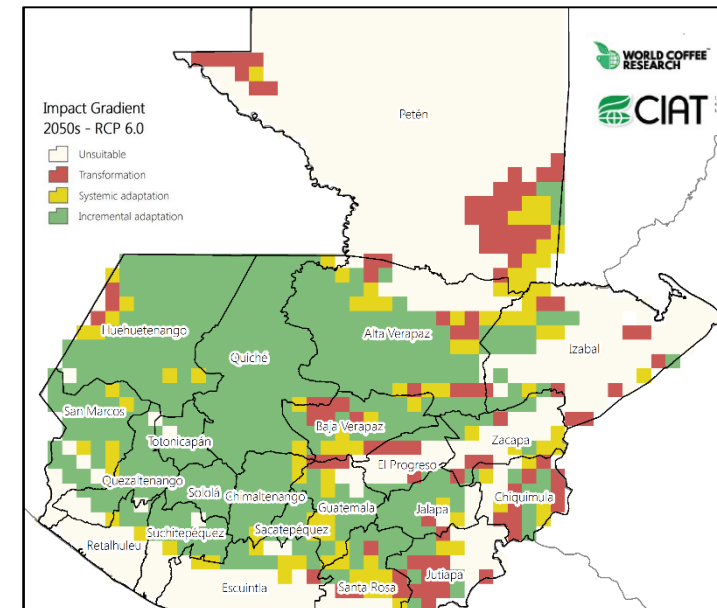
Potential increase in supply

~5-25%

Total national supply could increase ~2-15% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Climate change could impact some regions

Suitability map



- The eastern and central parts of Guatemala (especially Petén) could potentially be severely affected by climate change

Other viability considerations

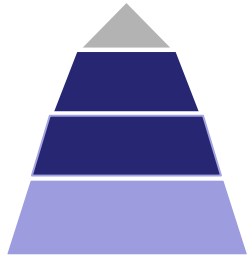
- There are almost no large and medium coffee farmers in Guatemala. They have mostly shifted to more profitable crops
- Relatively little government support, though Anacafé is well positioned to increase SHF incomes

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift is based on an internal estimate based on other mixed countries and current yields. (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 51%, and the range reflects a 25-100% R&R success rate. Sources: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; USDA, *Annual Coffee Report*, 2017; FNC, *Sostenibilidad en Accion*, 2013; Santiago Silva Restrepo; *Evaluacion de impacto de los progresos de renovacion de cafetales 2007-11*, 2012; *Risk and Finance in the Coffee Sector*, The world Bank, February 2015; Dalberg Interview

Several renovation programs have attempted to help Guatemalan SHFs recover from *La Roya*



SHF segmentation: Most SHFs are in tight & loose value chains



National production is dominated by SHFs

The majority of SHFs are either in tight or loose value chains. Most farmers groups do not have capacity to provide TA and finance to their members

SHFs
'000

122 (includes SHFs <7hectares – ~1% of global SHFs¹)

SHF land
'000 hectares

240 (~100% of national land) – average farm size typically ~2 hectares

SHF production
'000 tons

227 (~98% of national production)

Assessment of
SHF orgs.

~70% of SHFs are linked to coops or loosely organized groups

Links to market

A majority of SHFs are linked to the market through *coyotes*, 'loan sharks' that charge extremely high interest rates

Enabling environment for R&R: SHFs lack access to finance

Political environment



- Coffee share of GDP: 1.6% (2013)
- The National Coffee Association (Anacafé) advises the Government on coffee policies for production and commercialization
- In 2014, the government created the "Trust for financial support for producers in the coffee sector" (the Trust Fund) with assets of USD 100 million dedicated to supporting farmers affected by *La Roya*. To date, about 40% of the fund has not been disbursed

Availability of inputs



- Anacafé produces seeds (including the rust resistant variety Anacafé 14), but there is a lack of production at commercial volumes
- Many SHFs produce their own seeds, but these typically have low quality
- Seeds may be imported from Nicaragua, but the certification process is slow.

Availability of finance



- Low access to commercial bank loans for SHFs
- The Trust Fund has not yet been fully disbursed to SHFs

Knowledge availability



- Some coops provide TA, but coops generally have little capacity to deliver TA
- The Coffee Board does not prioritize the TA budget, and cuts it in case of crisis

Examples of R&R programs: Following *La Roya*, programs mostly focused on renovation of affected areas

- **Anacafé and USAID – Rural Value Chains project** (2012 - 2017) – Anacafé provided supported to farmer organizations to perform R&R. 129 organizations benefited from the project, over 3,000 hectares were renovated, and yields increased by over 60%
- **World Coffee Research - Seed Verification program** (2016 – 2020) – WCR partners with local nurseries to develop genetic control of seeds
- **Starbucks - One Tree One Bag** (2016-2018) – For each bag of coffee sold, Starbucks gives USD 0.70 to seed distribution to areas affected by *La Roya* in Guatemala, El Salvador and Mexico
- **Catholic Service Relief – Café Verde project** (2014 - 2016) - The project helped 765 SHFs to renovate old coffee plants susceptible to coffee rust

Notes: (1) Assuming a global SHF population of 20 million. Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; Root Capital, *Learning Report: the CFIR*, 2016; USDA, *Annual Coffee Report*, 2017; IHCAFE, *Programa de Asistencia al Pequeño Productor*, 2017; IHCAFE, *El sector café de Honduras: avances, institucionalidades and desafíos*, 2017; Dalberg Interview

Vietnam is the world's most productive coffee producing nation and has little need for R&R given its strong sector institutions

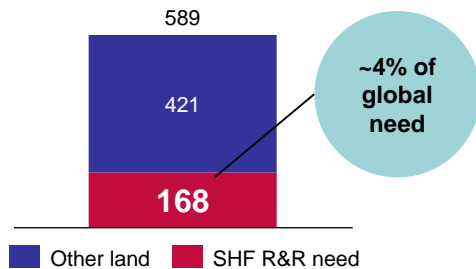


Quick facts: Vietnam is the world's second biggest producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
1,406	2nd in world 1st in Asia	589	~10% A ~90% R

R&R need: ~30% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



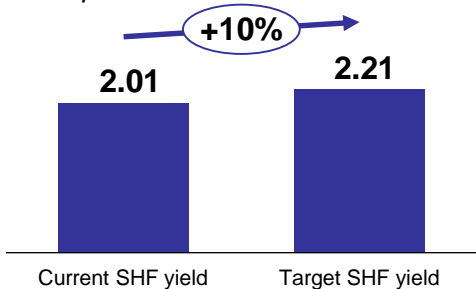
Drivers of R&R need:



The primary threat to Vietnamese trees are pests such as Nematodes. Trees are relatively young given a recent/ongoing national renovation effort. Farmers generally make use of GAP.

Uplift potential: Vietnam already has high yields

Current SHF yield & potential uplift¹
Tons per hectare



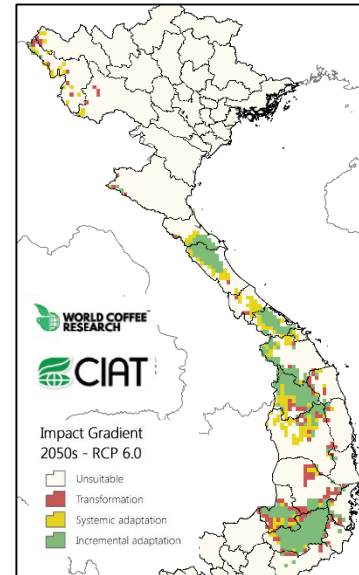
Potential increase in supply

<5%

Total national supply could increase ~1-2% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Continued high viability of coffee in Vietnam

Suitability map



- Arabica production in Vietnam could potentially be affected by Climate change – especially in the areas in the South and West of the country
- However, Arabica is currently only making up 10% of total production, why national supply is likely to be less affected

Other viability considerations

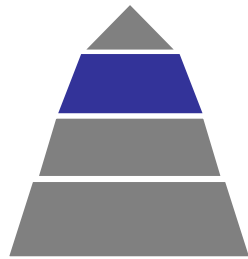
- ~90% of farmers have coffee as their main crop – less than 10% are intercropping
- Increase in intercropping with pepper since price of pepper is increasing, which gives an increased incentive to grow pepper when coffee is aged
- There is strong government support for coffee in Vietnam, and coffee production has reduced tax burden to help make the sector grow
- Farmers receive a high portion of the export price, with farmer share around 95%, making Vietnam the most cost-efficient coffee supply chain in the world³

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift comes from the GCP study on Vietnam: GCP, *Vietnam: GCP: Economic Viability of Coffee farming*, 2017; (2) Estimate assumes that R&R and GAP increase yields with 10%, and the range reflects a 25-100% R&R success rate; (3) See the GCP source listed in (1) for more detail on this. Sources: FAOstat, *Coffee production and land under coffee*, 2014; ICO production statistics; Dalberg interviews

Vietnam is dominated by some of the world's most productive SHFs with stable links to market and good availability of inputs



Farmer segmentation: SHFs have strong links to market



SHFs
'000

National production is dominated by SHFs

The vast majority of SHFs are in tight value chains with close and stable links to market. There is a high degree of competition among collectors and exporters creating stable links for SHFs

570 (other estimates as high as 800k) - 3-4% of global SHFs¹

SHF land
'000 hectares

560 (~95% of national land – average farm size: ~ 1 hectare)

SHF production
'000 tons

1,125 (~80% of national production)

Assessment of
SHF orgs.

Only 10% of SHFs are organized in coops, which have not been successful so far

Links to market

Strong links to market through a competitive sector

Enabling environment for R&R: Strong, but access to finance could be improved

Political
environment



- Coffee share of GDP: ~3% (2013)
- Government has been, and is, supportive of R&R efforts, having covered extensive TA programs for replanting and financing for replanting

Availability
of inputs



- Government is increasingly involved in ensuring quality and verification of seedlings of local nurseries
- There is a high availability of inputs, though some farmers reportedly tend to over-fertilizer their land

Availability
of finance



- Limited access to finance for most SHFs – commercial banks have little interest
- Collectors can provide access to finance, but do so at high interest rates and require SHFs to commit future sales
- Government has financed R&R

Knowledge
availability



- Farmers already make use of GAP, though there is potential for cost savings from correct application of fertilizer and irrigation systems

Examples of R&R programs: The Vietnamese government is the main actor in supporting farmers

- **Government of Vietnam and world Bank - VnSAT – Rejuvenation in the Central Highlands (2014-2020):** Government led program, supported by the world Bank, to replant 90,000 hectares and transplant 30,000 hectares in 5 regions in the Central Highlands. The cost of the project is estimated at USD 314 million.
- **Nestlé – Coffee replanting (2013):** Nestle partnered with the Western Highlands Agro-Forestry Scientific and Technical Institute (WASI) to distribute free seedlings to replant 270 hectares

Tanzania is an important regional producer with significant R&R need and yield uplift potential due to old trees and low adoption of GAP

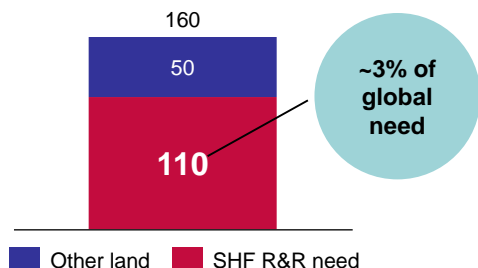


Quick facts: Tanzania is Africa's fourth biggest producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
49	16th in world 4th in Africa	160	~50-60% A ~40-50% R

R&R need: ~70% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



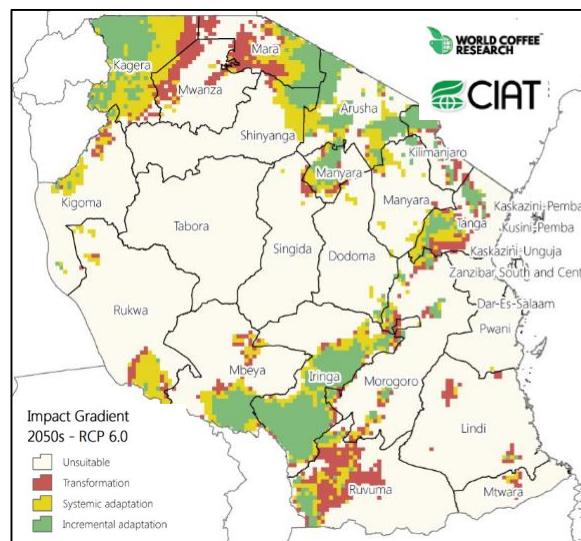
Drivers of R&R need:



Need is primarily driven by old trees (50-70 years in some places) and bad current practices, and to a lesser extent disease exposure/

Viability: Tanzania has low production costs, but high taxes

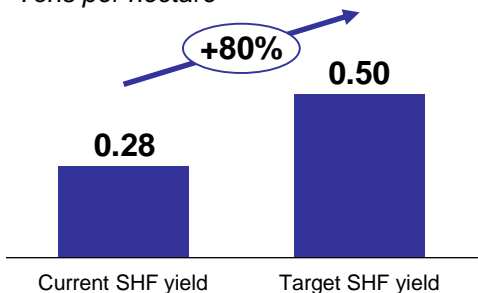
Suitability map: Arabica could be badly affected in particular regions



- Arabica in Mwanza, Mara, and Ruvuma provinces could be badly affected by climate change and become unsuitable for production in the future
- Areas in Kagera and Rukwa might be more suitable for other crops

Uplift potential: Significant uplift potential given low current SHF yields

Current SHF yield & potential uplift¹
Tons per hectare



Potential increase in supply

~15-50%

Total national supply could increase ~15-50% if R&R and GAP is implemented on all SHF land in need of R&R²

Other viability considerations: There is room for improved viability

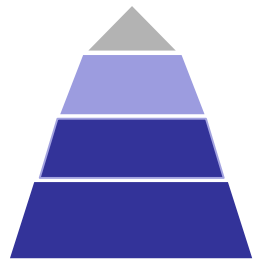
- Farmer share of the export price is low at 55-60% compared to estates and other countries where farmers are more closely linked to value chains
- Taxes are relatively high at 10-20% which could decrease further investment in sector
- Uplift potential is biggest for Arabica farmers, though Robusta farmers also have opportunities to improve
- Cost of production at farm level is low and has been fairly stable over past years

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift comes from the GCP study on Tanzania: GCP, *Tanzania: GCP: Economic Viability of Coffee farming*, 2017; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 80%, and the range reflects a 25-100% R&R success rate. Sources: FAOstat, *Coffee production and land under coffee*, 2014; ICO production statistics; GCP, *African coffee sector: Addressing national investment agendas on a continental scale: Tanzania case study*, 2016; USDA, *Annual Coffee report*, 2016; Dalberg interviews

Tanzania has a high number of small SHFs that lack access to R&R components, and the cooperative sector is still nascent, with low capacity



Farmer segmentation: Most SHFs are at the bottom of the pyramid



National production is dominated by SHFs

The majority of SHFs are either in loose value chains or weakly connected value chains, with unstable links to market. SHF orgs. are generally mismanaged and lack capacity

SHFs
'000

400 (2% of global SHFs¹)

SHF land
'000 hectares

150 (~90% of national land) – farm size typically <3 hectares (and even <1 hectare))

SHF production
'000 tons

45 (~90% of national production)

Assessment of
SHF orgs.

Nascent coop sector that has historically underperformed – ~50% of SHFs are linked to coops

Links to market

SHFs have loose and weak links to market

Enabling environment for R&R: Relatively weak enabling environment

Political environment



Availability of inputs



Availability of finance



Knowledge availability



- Coffee share of GDP: <1%
- Government plan (CIDS) to increase national production to 100,000 tonnes by 2020
- There are encouraging new investments from estates and other sector companies to support SHFs
- Insufficient number of functioning nurseries and there is a lack of production of seeds at commercial volumes.
- Farmers generally have low access to inputs
- The Coffee Development Fund (TCDF). Its main objective is to ease access to inputs to SHFs by funding R&D, extension service program, and improved planting material
- Given that coops are still developing,² there is little experience within local financial institutions with lending to coops, though this might increase in the future
- Lack of local extension service staff is a problem given the large geographical distribution of coffee production
- Efforts are in place to publish a standardized 'coffee curriculum' on GAP for all extension service workers, though implementation funding is lacking

Examples of R&R programs: Past R&R programs have focused on increasing adoption of GAP and building SHF organization capacity

- **Gates Foundation – The Coffee Partnership of Tanzania** (since 2012): The program provides training on farmer group formation and GAP, but does not include an integrated R&R package with planting material and finance
- **Technoserve – Coffee initiative (2008-2017)**: Focus on training farmers to increase GAP, including rehabilitation techniques. The program has reached more than 250,000 SHFs across Ethiopia, Kenya, Rwanda, and Tanzania
- **HRNS – Tanzania Program (2016-2019)**: The program focuses on increasing coffee production for 25,000 farmers in Northern Tanzania via better practices, and building commercial farmer organizations

Notes: (1) Assuming a global SHF population of 20 million – other estimates cite 2.4 million farmers in Tanzania, though this might include families relying on income from coffee. We have included the number in the range of 2-12%; (2) The sector was previously controlled by a national (monopolistic) coffee cooperative. Sources: GCP, *Tanzania: GCP: Economic Viability of Coffee farming*, 2017. FAOstat, *Coffee production and land under coffee*, 2014; GCP, *African coffee sector: Addressing national investment agendas on a continental scale: Tanzania case study*, 2016; USDA, *Annual Coffee report*, 2016; Dalberg interviews

R&R need in Colombia is low, since national replanting programs have already revitalized the tree stock, and current yields are high

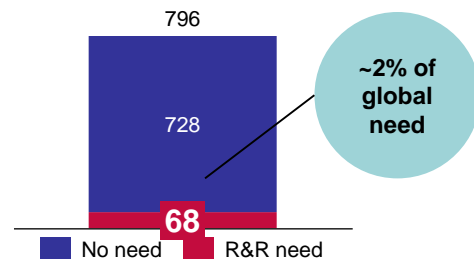


Quick facts: Colombia is the world's 2nd largest producer

Production '000 tons	Production share Global & region	Coffee land '000 hectares	Varieties Arabica-Robusta
728	3 rd in world 2 nd in LA	796	100% A 0% R

R&R need: <10% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



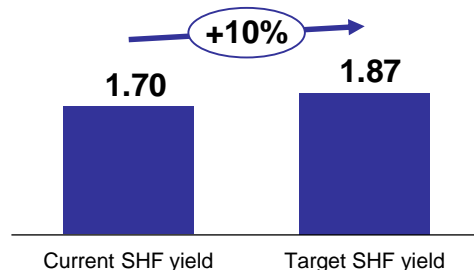
Drivers of R&R need:



Most of the diseased and aged trees were successfully renovated. There is not a strong case for R&R in Colombia

Uplift potential: Low uplift potential given high current SHF yields

Current SHF yield & potential uplift¹
Tons per hectare



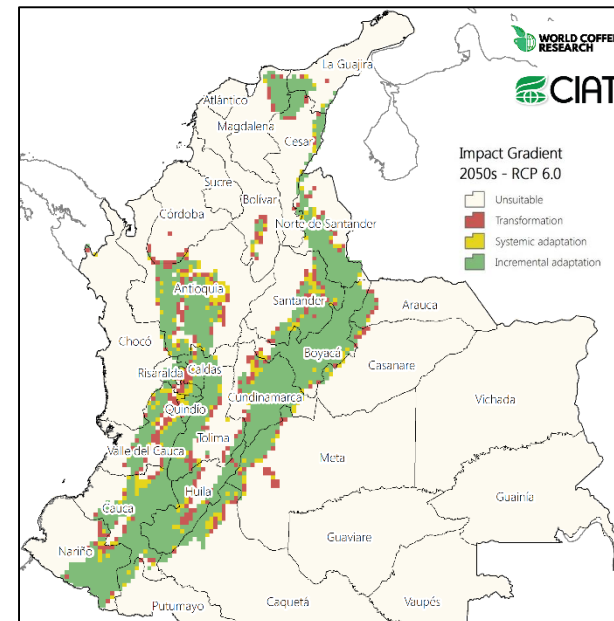
Potential increase in supply

~0-1%

Total national supply could increase ~0-0.5% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Relatively minor impact from climate change

Suitability map



- Climate change is forecast to have minor impact on Colombia
- Given its topography, there may be opportunities to move coffee plantations to higher altitudes if needed
- The lowest lying areas are the ones forecast to be hardest hit by climate change

Other viability considerations

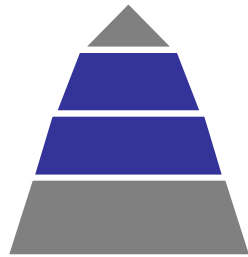
- Farmer share of export price is high at 85-90%
- Colombia coffee production performs at record levels not seen since the 1990's, creating overall confidence in the sector. This high level of production could be maintained given that 74% of production is planted with rust resistant varieties, compared to 35% in 2010
- The Colombian specialty coffee market is booming, increasing the value added for producers

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area, the potential yield uplift comes from the GCP study on Colombia: GCP, *Colombia: GCP: Economic Viability of Coffee farming*, 2017 - The study estimates a potential 20% yield uplift reached through fertilization, pest and shade management and targeted rejuvenation. We use a 10% yield estimate for this study since we do not account for irrigation; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 10%, and the range reflects a 25-100% R&R success rate. Sources: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; Root Capital, *Learning Report: the CFIR*, 2016; USDA, *Annual Coffee Report*, 2017; IHCAFE, *Programa de Asistencia al Pequeño Productor*, 2017; IHCAFE, *El sector café de Honduras: avances, institucionalidades y desafíos*, 2017; Dalberg Interview

Colombia's successful renovation programs were supported by strong coffee institutions



Farmer segmentation: Most SHFs are in tight and loose value chains



National production is dominated by SHFs

The majority of SHFs are either in tight or loose value chains. The national coffee federation (FNC) has strong linkages with SHFs

SHFs
'000

535 – ~3% of global SHFs¹

SHF land
'000 hectares

676 (~85% of national land) – average farm size ~1-2 hectares

SHF production
'000 tons

503 (~70% of national production)

Assessment of
SHF orgs.

The FNC has a network of 34 cooperatives that deliver TA to their members

Links to market

Many SHFs are linked to market through the FNC's network of 530 buying stations

Enabling environment for R&R: Well organized sector and supportive policies

Political environment



- Coffee share of GDP: N/A [Coffee share of exports: 7.2% (2015)]
- Coffee institutions (FNC, Coffee Fund) are strong and well organized
- Strong involvement of the Colombian government in renovation programs since the late 1990s. The Government and the FNC signed the "Coffee Prosperity Accord 2010-15" in 2009 and established an ambitious renovation program

Availability of inputs



- Cenicafe¹ leads research on varietal development, and has developed several rust-resistant varieties
- Since 2011, Cenicafe has been providing seeds at commercial volumes². Cenicafe also established a network of private nurseries to ensure a sufficient supply

Availability of finance



- SHFs have access to long term loans for R&R
- Public actors and local financial institutions such as the Colombian Ministry of Agriculture, Finagro, Banco de Bogotá, the National Coffee Fund (FoNC) provide finance to SHFs for renovation

Knowledge availability



- Coffee institutions provide extension services at national, regional and district level. However, these public extension services do not meet the demand and need of the SHFs
- Some cooperatives provide TA

Examples of R&R programs: Past R&R programs successfully met most of the R&R need

- **FNC and the Colombian Government – Competitiveness³ and Permanency, Sustainability and Future (PSF) programs** (late 1990s and 2009 – 2013): Through these two programs, more than 300,000 ha of land were renovated, both for SHFs and medium farmers.

Notes: (1) The Centre of Coffee Research was established in 1937 by the FNC, and has since remained under the management of the FNC; (2) Variety *Castillo*, rust resistant. (3) The Competitiveness Program (*Competitividad*) targeted large and medium scale producers. Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; USDA, *Annual Coffee Report*, 2017; FNC, *Sostenibilidad en Accion*, 2013; Santiago Silva Restrepo; *Evaluacion de impacto de los progresos de renovacion de cafetales 2007-11*, 2012; *Risk and Finance in the Coffee Sector*, The world Bank, February 2015; Dalberg Interview

Kenya is a relatively small global producer with significant need for R&R driven by suboptimal practices and high age of trees

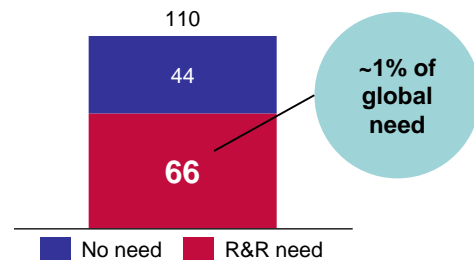


Quick facts: Kenya is a significant regional producer

Production '000 tons	Production share Global & region	Coffee land '000 hectares	Varieties Arabica-Robusta
52	18th in world 5th in Africa	110	100% A 0% R

R&R need: ~60% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



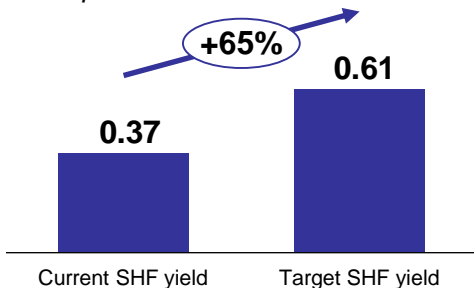
Drivers of R&R need:



Need is primarily driven by old trees (50-70 years in some places) and bad current practices. To a lesser extent, R&R need is driven by disease exposure (Coffee Wilt Disease) and by climate change in the Western part of the country

Uplift potential: High potential for SHF yield increase, though little impact

Current SHF yield & potential uplift¹
Tons per hectare



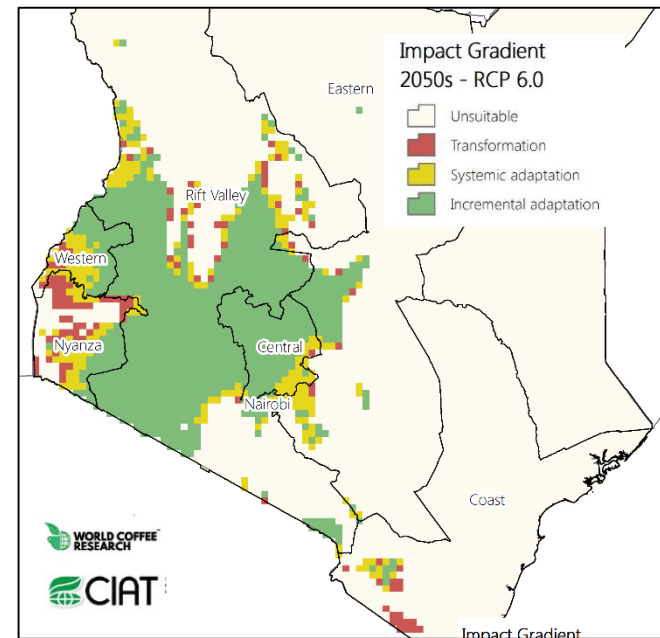
Potential increase in supply

~10-30%

Total national supply could increase ~10-30% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Climate change is expected to mainly impact Western Kenya

Suitability map



- The majority of Kenyan coffee growing areas look to be unaffected by climate change
- Areas in the southwest of the country look to be more affected

Other viability considerations

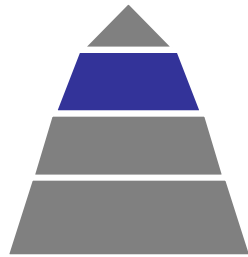
- Farmer share of the export price is around 75%. Local wet mills have the potential to decrease their operational costs, which could result in farm-gate price increases
- Labor costs on average equal USD 260 /ha, corresponding to more than twice the labor costs in Ethiopia and Tanzania. Labor costs have increased over the past years
- Traditional coffee growing areas face competition from housing and enterprise development

Notes: (1) Average yield is calculated as the total SHF production divided by the total SHF land. The potential yield improvement is estimated by GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 65%, and the range reflects a 25-100% R&R success rate. Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; USDA, *Annual Coffee Report*, 2017; Kenya Agricultural & Livestock Research Organization; Coffee Development Fund, *Financing Smallholder Coffee Farmers in Kenya*, 2011; Republic of Kenya, *Report of the National Task Force on Coffee Sub-Sector Reforms*, 2016; Dalberg Interview

Kenya's SHF coffee sector is built around cooperatives, but the enabling environment could be improved



Farmer segmentation: Most SHFs are in tight value chains



National production is dominated by SHFs

The majority of SHFs are members of coops, and therefore included in tight value chains

SHFs
'000

650 ~3.5% of global SHFs¹. SHFs are progressively replacing large plantations

SHF land
'000 hectares

83 (~75% of national land) – farm size typically ~0.1-0.5 hectares

SHF production
'000 tons

31 (~60% of national production)

Assessment of
SHF orgs.

Strong coop movement, but high level of mismanagement. ~100% of SHFs are linked to coops

Links to market

Coops links the overwhelming majority of SHFs to markets

Enabling environment for R&R: Relatively weak political support to coffee

Political environment



- Coffee share of GDP: N/A [Coffee Share of exports: 4.6% (2016)]
- National government and County governments cooperate in a “Task Force for Coffee sub-sector Reforms”, but observers complain about lacking coordination and poor implementation of legislative measures
- The Task Force recommends several measures, including the rule on prompt payment (farmers should be paid at least 40% of the prevailing price on the spot for the cherry they deliver), and a subsidy program for SHFs, offered as a package including fertilizer, planting materials for new varieties, and TA. Implementation of these measures is slow

Availability of inputs



- The Coffee Research Foundation (CRF) produces four different varieties of verified Arabica coffee, but not at commercial volumes
- Some cooperatives develop their own nurseries, sometimes with the support of private companies, but seeds are not controlled

Availability of finance



- Some cooperatives provide credit via the Coffee Development Fund¹ at affordable rates (5% in KES). However, volumes are limited
- Marketing agents and traders provide larger volumes of credit, but interest rates are high (>15% in KES)

Knowledge availability



- Not all coops are able to provide high-quality TA
- The Ministry of Agriculture and County governments provide extension services, but do not have sufficient extension officers to reach all SHFs

Examples of R&R programs: Past R&R programs have focused on increasing adoption of GAP and building SHF organization capacity

- **TechnoServe - The Coffee Initiative** (2008-2017): Technoserve trained roughly 12,000 Kenyan SHFs on the use of GAP and rehabilitation practices

Notes: (1) Assuming a global SHF population of 20 million. (2) The Coffee Development Fund is a state corporation under the Ministry of Agriculture in Kenya, established in 2006 as a financing vehicle for revitalizing the coffee sector. CoDF provide long-term affordable credits to farmers organized into cooperatives. Source: FAO Statistics database; ICO statistics; GCP and Technoserve, *Economic Viability of Coffee Farming*, 2017; USDA, *Annual Coffee Report*, 2017; Kenya Agricultural & Livestock Research Organization; Coffee Development Fund, *Financing Smallholder Coffee Farmers in Kenya*, 2011; Republic of Kenya, *Report of the National Task Force on Coffee Sub-Sector Reforms*, 2016; Dalberg Interview

Costa Rica is a relatively small producer with high R&R need driven by age of trees, disease and climate change

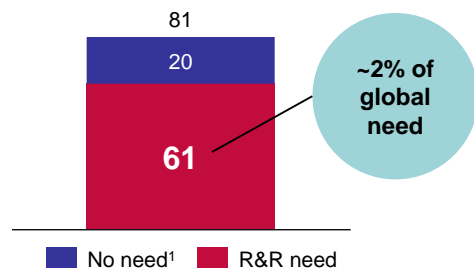


Quick facts: Costa Rica is a relatively small Arabica producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
84	14th in world 7th in LA	81	100% A 0% R

R&R need: ~75% of land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



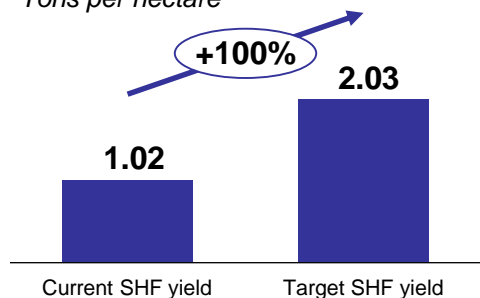
Drivers of R&R need:



Need is mostly driven by high age of trees (75% of trees have passed peak productivity), but also La Roya (affects 40% of trees) and climate change

Uplift potential: Significant uplift for SHFs, though little impact on supply

Current SHF yield & potential uplift¹
Tons per hectare



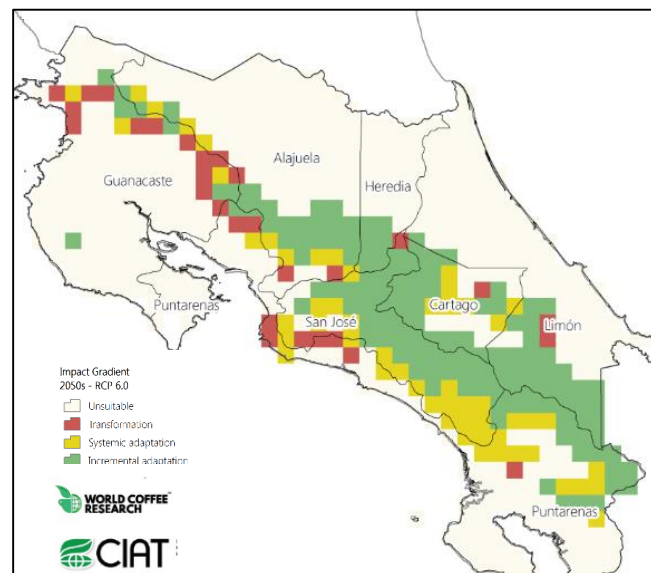
Potential increase in supply

~10-50%

Total national supply could increase ~10-50% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Western and Northern areas are exposed to climate change

Suitability map



- Costa Rica could be impacted by climate change, especially in its Western and Northern growing areas
- There is need for both transformation and systemic adaptation

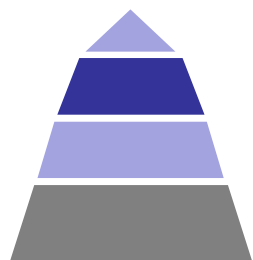
Other viability considerations

- Costa Rica has a well-functioning and transparent coffee sector that is relatively easy to invest in
- Production costs are high compared to other countries – partly as a result of government regulation: There is a relatively high minimum wage and imposition of 42% of social security tax.
- There is a strong enabling environment that contributes to the well-functioning of the coffee sector
- Diversification of income is needed – it takes around eight hectares to sustain a family of five, but average SHF farm size is around three hectares
- Farmer share of the coffee price is guaranteed by law

Costa Rica is dominated by SHFs that work in a well-structured coffee sector with strong government support and access to R&R project components



Farmer segmentation: Production is dominated by strong SHFs



National production is dominated by SHFs in tight value chains

Around 45% of SHFs are connected to coops and micro-mills. Farmer organizations are well run and help to conduct R&R. Farmers receive support to market efficiently through Banking System for Development

SHFs
'000

41 – ~0.5% of global SHFs

SHF land
'000 hectares

79 (~97% of national land) – farm size typically ~3 hectares¹

SHF production
'000 tons

53 (~60% of national production)

Assessment of
SHF orgs.

SHFs are typically organized in coops and micro-mills

Links to market

A majority of SHFs have strong links to market

Enabling environment for R&R: Strong environment for R&R

Political environment



- Coffee share of GDP: 0.7% in 2011 - Coffee exports reached \$374.9 million in calendar year 2011
- 55 of 81 cantons produce coffee – coffee is a major sector geographically and politically
- There is strong political support and the coffee sector is tightly regulated for increased transparency

Availability of inputs



- Costa Rica has authorized seed production programs
- The Coffee Institute of Costa Rica produces the seeds and a government body regulates this production

Availability of finance



- The Banking System for Development helps finance coffee production and R&R
- Farmers have access to flexible loan products through public banks

Knowledge availability



- The Coffee Institute of Costa Rica has a national research centre on coffee production
- SHFs cannot afford agronomists, but The Coffee Institute of Costa Rica has six regional offices that are fully in charge of implementing new capabilities for SHFs.

Examples of R&R programs: There has been a national replanting program in Costa Rica in recent years

- **National Program for Coffee Plantation Renewal (PNRC)** (2010-2015) – National replanting program with objective to replant 16,000 hectares, with funding of USD 81 million. Only 16% of objective was achieved

Nicaragua has recovered relatively well from a recent *La Roya* outbreak, though climate change and insufficient practices drive further R&R need

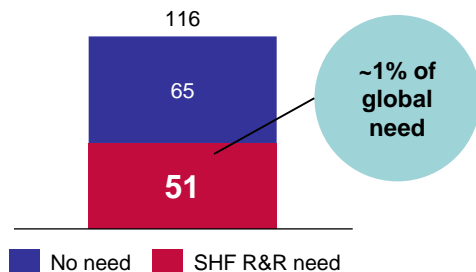


Quick facts: Nicaragua is a relatively small producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
90	12th in world 6th in LA	116	~100% A ~0% R

R&R need: ~45% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



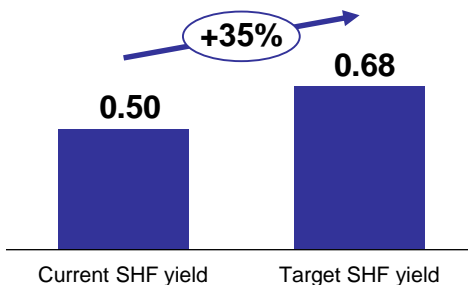
Drivers of R&R need:



The main drivers are disease (Nicaragua was hit by *La Roya*), bad current practices and old trees in some areas. Climate change could potentially also affect Nicaragua severely

Uplift potential: Though yields are low, SHFs are too few to drive total supply

Current SHF yield & potential uplift¹
Tons per hectare



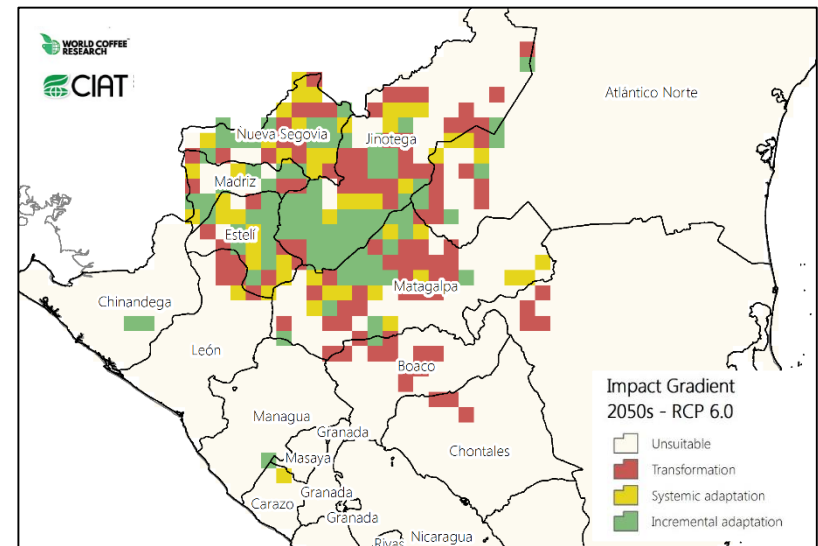
Potential increase in supply

~5-10%

Total national supply could increase ~5-10% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Climate change could be a risk – potential for Robusta?

Suitability map: Climate change could severely impact Nicaragua



- Several areas of Nicaragua could be severely affected by climate change, requiring transformative investments

- The forecast indicates that impact is spread throughout the country

Other viability considerations (from GCP viability study)

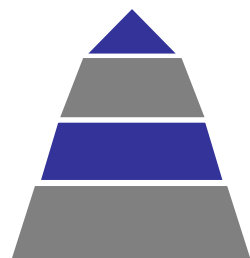
- Less than 2% of the production is currently in Robusta, but private sector investments expect to increase production of Robusta by 30% in 2017/18
- Farmers receive ~68% of the export price and the supply chain involves a number of intermediaries – there is room for increasing supply chain efficiency and SHF share of export price
- Nicaraguan coffee is well placed to qualify as specialty coffee. However, farmers are not currently incentivized to invest in quality improvements as they are unable to capture the associated premium

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area in 2014, the potential yield uplift comes from the GCP study on Nicaragua: GCP, *Nicaragua: GCP: Economic Viability of Coffee farming*, 2017 – this study cites an average SHF yield of 10.2qq/mz; (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 35%, and the range reflects a 25-100% R&R success rate. Sources: FAOstat, *Coffee production and land under coffee*, 2014; ICO production statistics

Nicaragua is less dominated by SHFs than other countries, and SHFs are therefore less likely to drive future supply uplifts



Farmer segmentation: SHFs represent ~40% of total production



National production is dominated by larger farms (>14 hectares)

SHFs¹ are predominately in loose value chains, relying on several middlemen to get to market

SHFs
'000

30-45 (<1% of global SHFs²)

SHF land
'000 hectares

70 (~60% of national land) – average farm size ~1.5-2.5 ha)

SHF production
'000 tons

36 (~40% of national production)

Assessment of
SHF orgs.

Coops are not dominant – export around 20% of coffee in 2012/2013

Links to market

SHFs most often rely on middlemen to sell their coffee. ECOM is dominant in the country and has close links to SHFs

Enabling environment for R&R: Relatively weak environment for R&R

Political environment



- Coffee share of GDP: N/A [Coffee share of exports: 8.3% (2015)]
- Liberal coffee economy: no coffee institute or board, 3 traders dominate the market (ECOM, Olam, Mercom)
- Tax income for coffee has been left in a fund because there is no disbursement rules

Availability of inputs



- Nicaragua has good seedling facilities that provide seeds for the whole region (Honduras, Guatemala, El Salvador) for the 1T1B program (Starbucks). Nicaragua has the 1st private lab for seedlings (CIRAT and ECOM)

Availability of finance



- Low availability of finance and limited presence of local banks in the R&R market (long term debt)
- Farmers connected to ECOM has relied on financing via their replanting programs (not just SHFs)

Knowledge availability



- SHFs lack access to training programs and there is a lack of public extension service officers

Examples of R&R programs: Past R&R programs have largely focused on renovation in response to La Roya

- **Root Capital, USAID, Keurig, Starbucks – Coffee Farmer Resilience Initiative (2013-2016):** USD 3.5 million in loans to a local coop for SHF renovation
- **ECOM, Starbucks, IDB, IFC – ECOM Renovation (2013-ongoing):** ECOM, in a innovative partnership with Starbucks, IFC, and IDB provided renovation loans to Nicaraguan farmers
- **Catholic Service Relief, CIAT – Rust to Resilience (2014-2016):** Renovation program to help farmers overcome *La Roya*

Papua New Guinea (PNG) is an important regional producer with significant potential for yield uplifts and increase in national supply

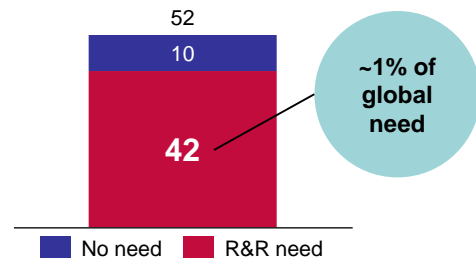


Quick facts: PNG is the 5th largest producer in Asia

Production ¹ '000 tons, 2014	Production share Global & region	Coffee land ¹ '000 hectares, 2014	Varieties Arabica-Robusta
56	16th in world 5th in Asia	52	~95% A ~5% R

R&R need: ~90% of total land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



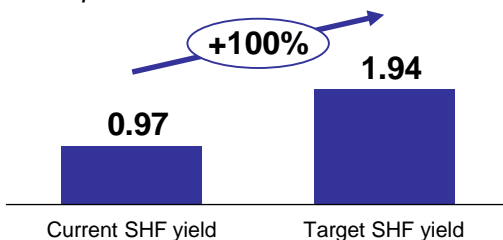
Drivers of R&R need:



Need is primarily driven by old trees and bad current practices. The recent outbreak of Coffee Berry Borer, an endemic beetle, increases the R&R need

Uplift potential: Significant uplift potential given low current SHF yields

Current SHF yield & potential uplift²
Tons per hectare



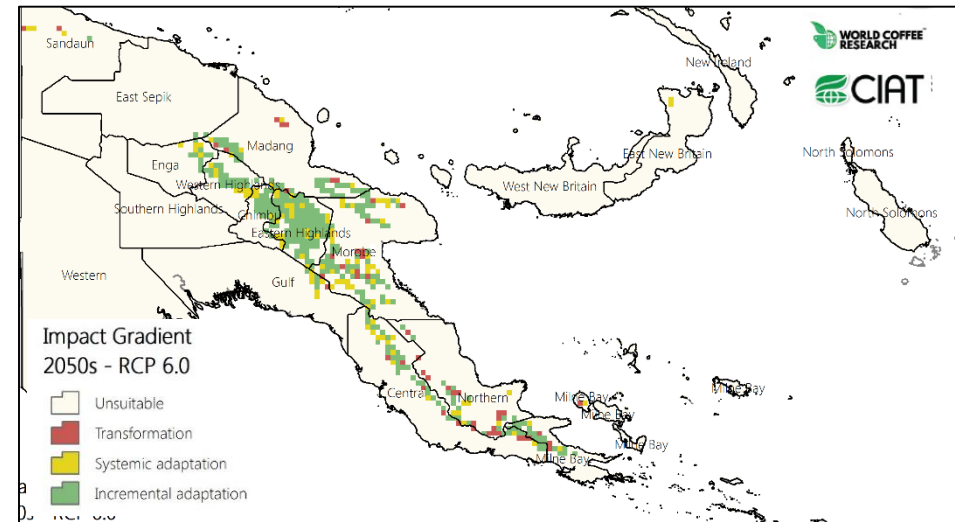
Potential increase in supply

~20-90%

Total national supply could increase ~20-90% if R&R and GAP is implemented on all SHF land in need of R&R³

Viability: Climate change is not forecast to impact significantly

Suitability map



- Climate change is not forecasted to impact PNG significantly though individual areas might require systemic adaption, and in few cases, transformation

Other viability considerations

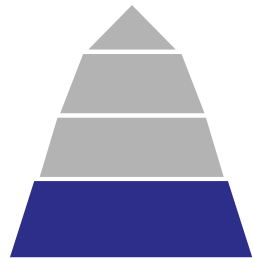
- No national or regional census have been held in Papua New Guinea so there is little comprehensive information on the coffee sector
- The lack of road infrastructure hampers the growth of the coffee sector and increases the difficulty of implementing R&R programs

Notes: (1) No formal mapping of coffee growing areas in the country has been undertaken. FAO data is highly uncertain and land under coffee is likely to be underestimated. (2) The current yield is calculated on the basis of SHF production divided by SHF land area. Given that coffee growing area is likely underestimated, SHF yields are likely estimated too high. (3) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 100%, and the range reflects a 25-100% R&R success rate. Our interviews suggest very low yields that could be doubled. Source: FAO Statistics database; ICO statistics; USDA, *Annual Coffee Report*, 2017; Daniel Giovanni and John Hunt, *Papua New Guinea: Strategic Assessment of the Coffee Sector*, 2009; CIC, *The Papua New Guinea Coffee Handbook*, 2016; Dalberg Interview

Papua New Guinea has structural deficiencies that hamper the development of the coffee sector



Farmer segmentation: Most SHFs are at the bottom of the pyramid



National production is dominated by SHFs

The majority of SHFs are in disconnected value chains, with weak and erratic links to market. SHF orgs. are generally mismanaged and lack capacity

SHFs
'000

~500 – There is no population census, hence high uncertainty on the number of SHFs

SHF land
'000 hectares

47 (~90% of national land) – farm size typically <1 hectare)

SHF production
'000 tons

45 (~95% of national production)

Assessment of
SHF orgs.

Weak and underperforming coop sector – ~5% of SHFs are linked to coops

Links to market

SHFs have no formal links to market and sell their unprocessed coffee in road markets

Enabling environment for R&R: Weak enabling environment

Political environment



- Coffee share of GDP: N/A [Coffee share of exports: 1.6% (2015)]
- Observers describe the Coffee Industry Corporation (CIC) as a bureaucratic and inefficient organization
- The lack of roads is a bottleneck for productivity and exports

Availability of inputs



- No centralized nurseries
- Seeds are produced by farmers themselves using traditional techniques, with no quality control
- SHFs have little, or no access, to other inputs (e.g. fertilizers)

Availability of finance



- SHFs have limited access to long-term credit. Banks or credit institutions do not lend to unorganized SHFs
- Exporters / private sector actors can pre-finance SHFs, but this source of finance is inefficient for R&R

Knowledge availability



- Most SHFs do not receive any form of TA
- PNG is the most linguistically diverse country in the world, with over 850 languages spoken. This diversity, together with the lack of infrastructure, makes the providing of TA to SHF difficult and costly

Examples of R&R programs: Past government R&R programs were mostly unsuccessful

- **CIC and Government - Industry-wide renovation pruning** (late 1990s) – The purpose of the program was to increase productivity, but, according to interviews and observes, the program was mismanaged and achieved poor results
- **Government - National Agriculture Development Plan** (2006 – 2011) – The program aimed at “*Injecting new life*” into agriculture and the coffee sector, but was mismanaged and abandoned after five years
- **The world Bank - Productive Partnership in Agriculture** (2010 – 2019) – The purpose of the program is to improve the livelihoods of coffee and cocoa SHFs through improved productivity. To date, the program has focused more on cocoa renovation

El Salvador's coffee production was severely hit by *La Roya* and could be highly exposed to climate change

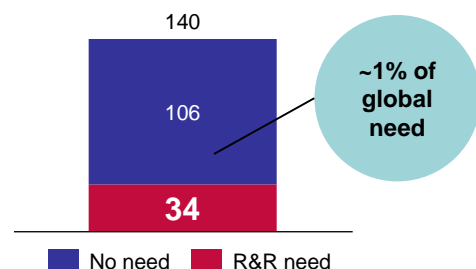


Quick facts: El Salvador is a relatively little producer

Production '000 tons, 2014	Production share Global & region	Coffee land '000 hectares, 2014	Varieties Arabica-Robusta
42	20 th in world 10 th in LA	140	100% A 0% R

R&R need: ~80% of land is in need of R&R

SHF land in R&R need out of all land
'000 hectares



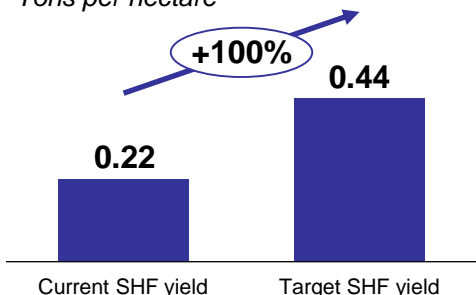
Drivers of R&R need:



Need is driven by exposure to climate change in most of the coffee growing areas, age of trees, and exposure to disease (more than 70% of coffee lands were affected by *La Roya*)

Uplift potential: Significant uplift for SHFs, though little impact on supply

Current SHF yield & potential uplift¹
Tons per hectare



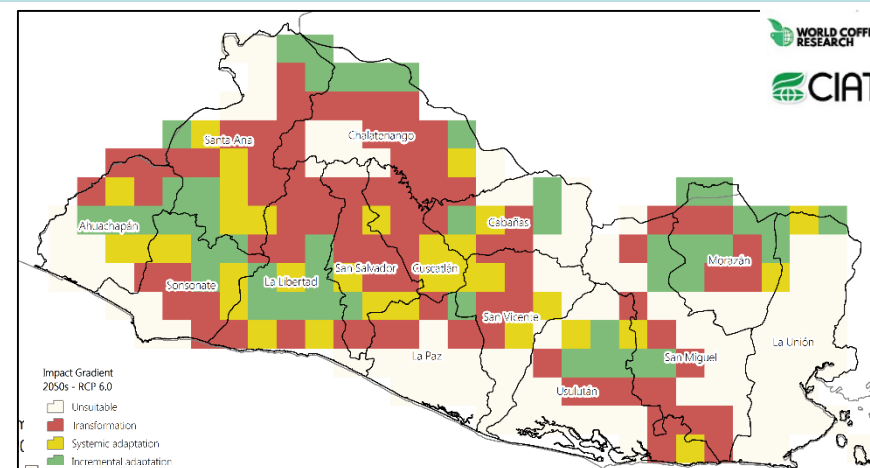
Potential increase in supply

~5-15%

Total national supply could increase ~5-15% if R&R and GAP is implemented on all SHF land in need of R&R²

Viability: Most coffee growing areas are exposed to climate change

Suitability map



- Climate change could severely affect most of El Salvador's coffee regions

Other viability considerations

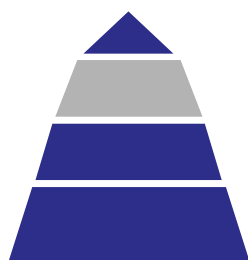
- Many children of coffee farmers turn to more lucrative, or less climate exposed food crops, or to non-farm activities
- Minimum daily wage for coffee harvesters is low – approximately USD 4
- Labor costs/salaries have decreased by 12% over the past five years, while fertilizer costs have increased by 3% and financial costs by 5%
- The "Cup of Excellence" competition promotes specialty coffees in El Salvador. Focusing on specialty coffee markets could increase producers' revenues

Notes: (1) The current yield is calculated on the basis of SHF production divided by SHF land area. The potential yield uplift is based on an internal estimate based on other mixed countries and current yield. (2) Rounded to the nearest 5%, estimate assumes that R&R and GAP increase yields with 100%, and the range reflects a 25-100% R&R success rate. Sources: USDA, *El Salvador: Annual Coffee Report*, 2017; Jimmy Sherfey, 'Salvador's Coffee Industry at a Crossroads', <https://dailycoffeenews.com/2016/01/06/el-salvadors-coffee-industry-at-a-crossroads/>, 2016; International Coffee Organization, *Perfil de país cafetero: El Salvador*, 2016.

El Salvador is dominated by medium and large farms, and SHFs therefore have less impact on potential increase in total supply



Farmer segmentation: Production is dominated by large farmers



SHFs
'000

17 – ~0.1% of global SHFs²

SHF land
'000 hectares

30 (~30% of national land) – farm size typically ~0.5 hectares

SHF production
'000 tons

8.5 (~20% of national production)

Assessment of
SHF orgs.

SHFs are typically not organized in coops

Links to market

A majority of SHFs have loose and erratic links to market

National production is dominated by large producers

40% of coffee farms are large estates above 70 hectares¹. There are 81 large cooperatives, but they do not target SHFs, who are mostly disconnected or in loose value chains

Enabling environment for R&R: Relatively weak environment for R&R

Political environment



- Coffee share of GDP: N/A [Coffee share of exports: 2.6% (2015)]
- There is insufficient political support to overcome the coffee sector crisis
- Government assistance programs to support SHFs affected by La Roya have mostly been ineffective

Availability of inputs



- El Salvador is the only coffee producing nation in Latin America that does not have a research institution that provides certified rust resilient seeds
- The lead SHF extension service institution, CENTA, aims to provide 8 millions rust resistant plants to SHFs in 2017

Availability of finance



- SHFs are highly credit constrained
- 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. The Bank aim to deliver USD 6.5 million in loans to SHFs

Knowledge availability



- The Salvadoran Coffee Council and CENTA provide extension services to SHFs. CENTA employs 85 officers who assist 7,000 SHFs with bi-monthly visits and field training
- Observers complain about the low efficiency of public extension services

Examples of R&R programs: Past R&R programs have focused on renovating areas affected by La Roya

- **Starbucks - One Tree One Bag** (2016-2018) – For each bag of coffee sold, Starbucks gives USD 0.70 to seed distribution to areas affected by *La Roya* in Guatemala, El Salvador, and Mexico
- **NCBA CLUSA - Coffee rehabilitation and agricultural diversification project** (2014 – 2018): NCBA CLUSA is working to improve the capacity of 50 cooperatives and 7,500 SHFs to renovate 6,000 hectares
- **World Coffee Research - Seed Verification program** (2016 – 2020) – WCR partners with local nurseries to develop genetic control of seeds

Notes: (1) A majority of coffee estates were parceled out into SHF properties as part of an agrarian reform in the 1980s (2) Assuming a global SHF population of 20 million. Sources: USDA, *El Salvador: Annual Coffee Report*, 2017; Jimmy Sherfey, *Salvador's Coffee Industry at a Crossroads*, 2016; International Coffee Organization, *Perfil de pais cafetero: El Salvador*, 2016, Ecuador Government, *National Census*, 2017.