

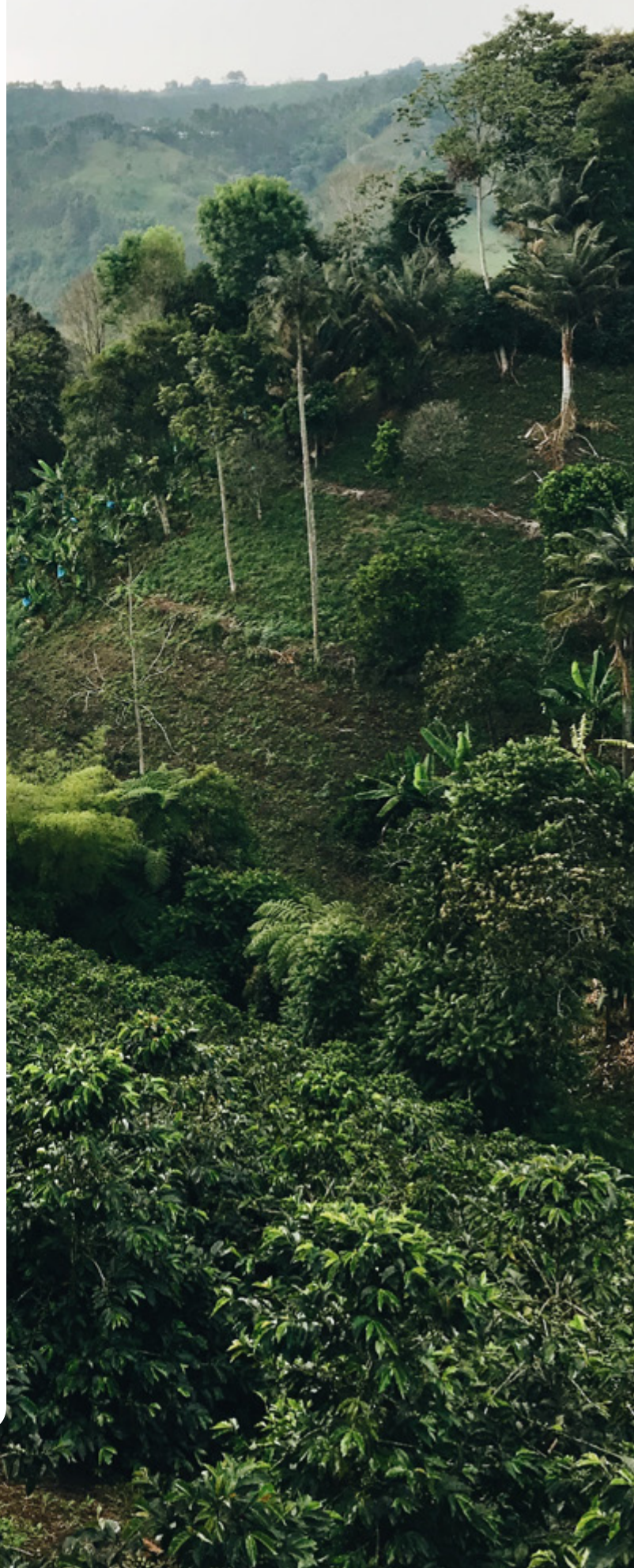
*coffee & climate*



# BREWING UP CLIMATE RESILIENCE IN THE COFFEE SECTOR

---

Adaptation strategies for  
farmers, plantations,  
and producers







# TABLE OF CONTENTS

---

<b>Introduction</b> <b>IT'S TIME TO CHANGE HOW COFFEE ACTS ON CLIMATE</b>	<b>4</b>
<b>Chapter 1</b> <b>CLIMATE ADAPTATION</b>	<b>5</b>
<b>How can the coffee industry take action on climate?</b>	<b>5</b>
Understanding climate impact	5
Using the Climate Impact Chain	6
Implementing adaptive measures	6
<b>Chapter 2</b> <b>THE 5 BIG ISSUES</b>	<b>8</b>
<b>What are the critical climate challenges facing coffee?</b>	<b>8</b>
<b>How severe are the risks, and is there a resolution?</b>	<b>13</b>
1. Loss of suitable area for coffee production and shifts to higher altitudes	13
2. Increased water stress	13
3. Poor flowering and cherry development due to rising temperatures	14
4. Increased outbreaks of pests and diseases	14
5. Increased vulnerability of smallholder and women farmers	15
<b>Chapter 3</b> <b>INSPIRATION FOR CHANGE</b>	<b>16</b>
<b>What strategies can be used to increase climate resilience?</b>	<b>16</b>
1. Further research on the impacts of climate change on coffee	17
2. Site-specific on-farm and processing investments	18
3. Designing and implementing financial mechanisms to facilitate investment	20
4. Investing in adaptation, breeding, and development of more resistant coffee varieties	23
5. Strengthening national development and environmental policies.	25
6. Strengthening farmer organizations.	27
<b>Chapter 4</b> <b>FUNDING OPPORTUNITIES</b>	<b>28</b>
<b>What financing sources can be leveraged for adaptation?</b>	<b>28</b>
<b>What types of investors fund climate adaptation?</b>	<b>29</b>
<b>Conclusion</b> <b>LET'S GET BREWING FOR CHANGE</b>	<b>31</b>



## INTRODUCTION

# IT'S TIME TO CHANGE HOW COFFEE ACTS ON CLIMATE

Rising temperatures, erratic rainfall, greenhouse gasses — climate change is more than just brewing, it's beginning to reach a rolling boil. As a crop with highly specific temperatures and rainfall patterns critical to sustaining production, coffee is feeling the heat. Not only is climate change threatening the future suitability of growing regions with major shifts or entire loss, it is also amplifying the challenges already facing the industry — from aging coffee trees and pest and disease outbreaks, to poor management practices and limited investment funding for implementing change.

Climate change is a complex, critical issue and we must act now to create a resilient and sustainable coffee sector. Adapting farms and buffering communities against climate impact is a daunting prospect, with smallholder farmers, and women in particular, the most vulnerable and at risk.

WE MUST ACT NOW TO CREATE A RESILIENT AND SUSTAINABLE COFFEE SECTOR.

IT'S UP TO ALL OF US TO TAKE ACTION ON CLIMATE CHANGE ADAPTATION — FROM PROTOTYPING AND SCALING INTERVENTIONS TO SHARING LEARNINGS TO DRIVE UPTAKE AND MOMENTUM.

The situation is intensifying, but the obstacles are not yet insurmountable. Many initiatives are already underway, but adaptation of the sector at global scale requires increased alignment and acceleration of these efforts. Country analyses show that, while mitigation can be addressed with more universal approaches, **adaptation is highly site specific**. As such, it's up to all of us to take action — from prototyping and scaling interventions to sharing learnings to drive uptake and momentum.

This brochure aims to inspire action by providing a clear understanding of the most pressing challenges, highlighting where there is room for opportunity, inspiring action through examples of successful interventions, and catalyzing investments by connecting coffee industry actors with available financing options.

## CHAPTER 1

# CLIMATE ADAPTATION

## HOW CAN THE COFFEE INDUSTRY TAKE ACTION ON CLIMATE?

### Understanding climate impact

Adaptation to climate change means taking specific action to reduce the exposure and vulnerability of people and assets to the projected risk of meteorological changes and the hazards they present. Both scientific findings and country analyses show that — unlike mitigation, where the same measures will achieve similar results almost anywhere, adaptation is highly site specific. A climate adaptation measure that works in one place will not necessarily achieve the same effect in a different location — and may even worsen exposure or vulnerability.



Developing effective adaptation plans requires a site-specific climate risk and vulnerability assessment. First, understanding the likely physical impact of climate-related events such as floods, frosts, droughts, and higher temperatures, then anticipating the exposure of people and assets to these hazards, and finally determining the vulnerability of farms and communities, based on their ability to adapt.

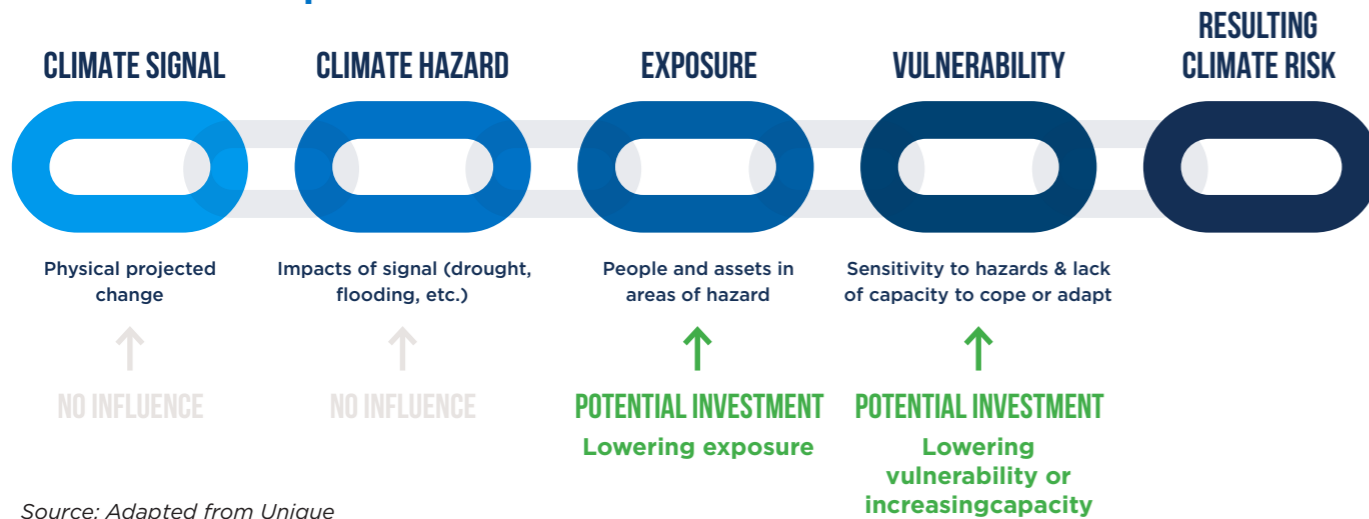


## Using the Climate Impact Chain

While we cannot directly affect climatic events, we can invest in activities that limit exposure to hazards and increase the ability of farmers and the coffee trees themselves to adapt to the new conditions. Climate assessments are highly site specific, and need to be granular enough to inform adaptation decisions at the farm level while not losing the landscape perspective. The Climate Impact Chain is an assessment framework

created to help stakeholders understand the relationship between cause and identified problem, and how to target investments and interventions to achieve the greatest impact. More and more, its is becoming a formal requirement for a growing number of climate donors wanting to prove that their investments are designated for adaptation to climate change.

## The Climate Impact Chain



Source: Adapted from Unique

### Exposure risk

In any area, climate hazards present in varying degrees. If your coffee plant, processing company or value chain is not exposed, owing to location or micro-climate, your climate risk is low.

### Vulnerability risk

If you have adequate management systems in place or a high level of diversification, vulnerability and resulting risk will be minimal or non-existent.

## Implementing adaptive measures

Once areas of potential investment are defined, a plan to implement adaptive measures can be drawn up to reduce climate risk. It is essential that the plan considers decisions at farm level, while not losing the landscape perspective. An often-cited scenario is moving a coffee farm uphill as an adaptation measure against rising temperatures — but in so doing, the farm could expose neighboring farms to climate hazards and deprive them of important ecosystem functions as a result of deforestation.



## HOW CAN THE COFFEE INDUSTRY REDUCE ITS OWN CLIMATE CHANGE FOOTPRINT?



Reducing fertilizer overuse to prevent greenhouse gas emissions, soil acidification and frequent topsoil changes.



Reducing deforestation to help maintain carbon sinks.



Reforestation riparian zones and introducing shade trees to increase carbon sinks.







CHAPTER 2

# THE 5 BIG ISSUES

---

## WHAT ARE THE CRITICAL CLIMATE CHALLENGES FACING COFFEE?

While adaptation needs to be considered on a granular level, expected climate impacts are much broader, with research revealing definite patterns in exposure and vulnerability even when results vary by region.

Following a Climate Impact Chain analysis carried out in 15 countries across Asia, Africa, and Central and South America (see map below) — representing 90% of global coffee production — five key climate risks emerged:

- 1 Loss of suitable area for coffee production and shifts to higher altitudes
- 2 Increased water stress
- 3 Poor flowering and cherry development due to rising temperatures
- 4 Increased outbreaks of pests and diseases
- 5 Increased vulnerability of smallholder and women farmers



# COUNTRIES INCLUDED IN THE ANALYSIS

KEY COFFEE SPECIES<sup>1</sup>
 AREA UNDER COFFEE<sup>1,3</sup>
 AVERAGE PRODUCTIVITY<sup>2</sup>
 NUMBER OF SMALLHOLDERS
   
 FARM SIZE<sup>4</sup>
 % OF NATIONAL PRODUCTION
 SHADE & INTERCROPPING<sup>5</sup>

## MEXICO

**ARABICA**
  
 720,000 ha under coffee
   
 0.2 tonnes/ha per year
   
 500,000 smallholders
   
**NOT SPECIFIED**
  
 40% national production
   
 Traditional full shade<sup>6</sup> & agroforestry

## GUATEMALA

**ARABICA/ROBUSTA**
  
 310,000 ha under coffee
   
 0.7 tonnes/ha per year
   
 120,000 smallholders
   
 Ø 1.2 ha
   
 47% national production
   
 Under shade

## COSTA RICA

**ARABICA/ROBUSTA**
  
 80,000 ha under coffee
   
 1.1 tonnes/ha per year
   
 40,000 smallholders
   
 Ø 3 ha
   
 60% national production
   
 In mono-culture, sometimes under light shade

## COLOMBIA

**ARABICA**
  
 940,000 ha under coffee
   
 0.9 tonnes/ha per year
   
 560,000 smallholders
   
 Ø 2 ha
   
 70% national production
   
 In mono-culture and with shade trees

## PERU

**ARABICA**
  
 390,000 ha under coffee
   
 0.7 tonnes/ha per year
   
 130,000 smallholders
   
 Ø 2.3 ha
   
**NOT SPECIFIED**
  
 Under shade

## HONDURAS

**ARABICA**
  
 340,000 ha under coffee
   
 1.1 tonnes/ha per year
   
 500,000 smallholders
   
 70% < 2 / 25% 2-7 ha
   
 70% national production
   
 Under shade, about 20% in full sun

## NICARAGUA

**ARABICA**
  
 130,000 ha under coffee
   
 0.7 tonnes/ha per year
   
 40,000 smallholders
   
 Ø 2 ha
   
 40% national production
   
 Agroforestry

## BRAZIL

**ARABICA / ROBUSTA**
  
 2.1 M ha under coffee
   
 1.6<sup>7</sup> tonnes/ha per year
   
 300,000 smallholders
   
 Ø 5 ha
   
 <40% national production
   
 In mono-culture

## UGANDA

**ROBUSTA/ARABICA**
  
 350,000 ha under coffee
   
 0.6 tonnes/ha per year
   
 1.7 M smallholders
   
 0.5-3 ha
   
 85% national production
   
 Mixed with annual crops or banana, or in agroforestry

## ETHIOPIA

**ARABICA**
  
 530,000 ha under coffee
   
 <0.5 tonnes/ha per year
   
 2 M smallholders
   
 0.5-2 ha
   
 90% national production
   
 Traditional full shade<sup>6</sup> & agroforestry

## RWANDA

**ARABICA**
  
 40,000 ha under coffee
   
 0.4 tonnes/ha per year
   
 360,000 smallholders
   
 Ø 0.1 ha
   
 ~100% national production
   
 Mixed with food crops or in mono-culture

## TANZANIA

**ARABICA / ROBUSTA**
  
 270,000 ha under coffee
   
 0.2 ARABICA / 0.5 ROBUSTA tonnes/ha per year
   
 450,000 smallholders
   
 Ø 0.8 ha
   
 90% national production
   
 In Mono-culture or mixed with annual crops and banana

## CHINA

**ARABICA**
  
 120,000 ha under coffee
   
 1.1 tonnes/ha per year
   
 200,000 smallholders
   
 < 0.5 ha
   
**NOT SPECIFIED**
  
 In mono-culture or mixed with fruit trees

## VIETNAM

**ROBUSTA/ARABICA**
  
 690,000 ha under coffee
   
 2.4 tonnes/ha per year
   
 600,000 smallholders
   
 Ø 1 ha
   
 95% national production
   
 In mono-culture and intercropped with other cash crops (black pepper)

## INDONESIA

**ROBUSTA/ARABICA**
  
 1.25 M ha under coffee
   
 0.8 tonnes/ha per year
   
 150,000 smallholders
   
 Ø 1 ha
   
**NOT SPECIFIED**
  
 Under (dense) shade

<sup>1</sup> Extracted from ICO statistics. The more important species is listed first.
   
<sup>2</sup> Values are rounded to the nearest 10,000.
   
<sup>3</sup> Refer to the individual profiles for details.
   
<sup>4</sup> Smallholder farm size usually refers to the farm area where coffee is the key crop.

<sup>5</sup> Reflects the most common farming systems in each country.
   
<sup>6</sup> Traditional shade refers to coffee grown under forest tree species.
   
<sup>7</sup> For farms without mechanization

## Climate Impact Chain Analysis on 15 countries

The below figure shows a synopsis of synthesized outcomes across the 15 countries analyzed, based on the vulnerability and exposure assessments needed in the climate impact chain.



### CLIMATE HAZARD

#### Overall temperature rise of 1.5 to 3° by 2050.

- Daily temperature range decrease.
- Variability of rainfall within and between years.
- El Niño increase in frequency and intensity causing droughts, excess rain and hurricanes.



### EXPOSURE

#### Exposed assets

- 8,260,000 ha of land across the 15 countries analyzed (calculated by area under cultivation and whether Arabica or Robusta is grown.)

#### Exposed individuals

- 8,500,000 smallholders and dependents across the 15 countries analyzed (calculated by number of farmers, family members, and direct workers.)



### VULNERABILITY

**Sensitivity to exposure** (calculated by average productivity, role of smallholders, and most common farming practices.)

- Low productivity mainly caused by limited ability to purchase inputs and inadequate access to technology through extension services.
- In some countries, coffee trees are well beyond peak productivity which can increase exposure to pests and diseases.
- Ecosystem vulnerability is likely to be higher on monoculture farms but usually compensated by higher levels of technical, knowledge, and financial capacities in place.

**Capacity to cope** (calculated by SWOT analysis of technical, economic, political, and organizational levels in 7 countries.) They are hardest to synthesize but reveal that:

- Research into new varieties and developing adaptive farming techniques is good in countries with strong agricultural research bodies (Brazil, Columbia, Ethiopia). Dissemination to farmers remains a challenge.
- Financial services are better available in Latin America than Africa and Asia.
- No sector-wide approach exists except in Costa Rica. Political pledges and commitments are not backed by sector policies.
- Policies and finances for sustainable development of agriculture are unreliable and not favored over conventional approaches.
- Better access to advisory services and funding in countries with strong private and state-led organizations.



### CLIMATE RISK

- Area loss and shift
- Water stress
- Poor flowering and cherry development
- Pests and diseases
- Vulnerability of smallholders and women

## HOW SEVERE ARE THE RISKS, AND IS THERE A RESOLUTION?

### 1 Loss of suitable area for coffee production and shifts to higher altitudes

#### RISK

The main climate risk across all analyzed countries is the reduction or complete loss of areas suitable for growing current coffee varieties.

By 2050, land suitable for Arabica production is predicted to reduce by 49-56%, and by 55% for Robusta, with Brazil, South East Asia, and West Africa most affected. As well as reducing productivity, this poses a threat to the genetic heritage and diversity of both species.

Climate change may also make some land more suitable for growing coffee. Shift or expansion to new areas would however be limited as most of this land is currently forested or used for other crops. A strong regulatory environment and industry commitment would be needed to manage deforestation risk.



#### RESOLUTION

- ✓ In areas of suitability decrease, adapting farm management practices and integrating climate-smart agriculture practices.
- ✓ In areas of suitability loss, promoting crop and income diversification.
- ✓ In new areas becoming more suitable for coffee production, increasing forest protection.

### 2 Increased water stress

#### RISK

Globally, rainfall is becoming more erratic, and irrigation is limited to very few countries where adequate infrastructure and access to freshwater resources exist. In Vietnam and Brazil, the world's biggest coffee producers, a large number of coffee farms are irrigated. Here, drier and warmer conditions will increase the need for irrigation while likely reducing water availability.



#### RESOLUTION

- ✓ Investing in water-efficient and water-saving technologies for irrigation and processing.
- ✓ Investigating opportunities for weather forecasting to better inform on-farm water management (as per Vietnam).



### 3 Poor flowering and cherry development due to rising temperatures

#### RISK

Suboptimal flowering and cherry development is omnipresent as a result of drought and heat, with dry conditions additionally stressing trees and leading to dieback.

Changes in rainfall also affect yield and quality — causing issues including poor pollination, abortion of flowers and fruit, reduced bean size, heterogenous flowering, and longer harvests, which add to costs, and impact quality when farmers collect green cherries together with ripe. Storms with heavy wind and rain can also cause damage to trees and equipment.



#### RESOLUTION

- ✓ Adapting farm management practices and integrating climate-smart agriculture practices in areas of slight suitability decrease.
- ✓ Researching and developing new varieties.
- ✓ Exploring opportunities to lower coffee plant temperatures and rainfall intensity through introduction or improved management of shade trees (shade regulation) and cover crops for soil management.



### 4 Increased outbreaks of pests and diseases

#### RISK

Temperature changes create a ripe environment for pests and disease, and increased incidences and severity are a concern across all countries. For example, coffee leaf rust and coffee berry borer are now found at high altitudes, with borer and other insects also accelerating their life cycles within a season and causing more damage to crops. In addition, only 5% of an estimated 11.5 million farmers are currently able to effectively renovate or rehabilitate their coffee trees to maintain productivity.



#### RESOLUTION

- ✓ Investing in rehabilitation and restoration of farms with disease-resistant varieties together with climate-smart agriculture practices as one package.
- ✓ Promoting training and adoption of improved pest and disease management techniques that minimize human and environmental risks.

### 5 Increased vulnerability of smallholder and women farmers

#### RISK

Climate change will hit smallholders and women coffee farmers hardest. Smallholders are least resilient, often depending almost entirely on coffee as a livelihood. As such, in addition to the risks above, price volatility often prevents on-farm investments, including for climate change adaptation. This is further limited by small farm size, and reduced access to finance, know-how, and technology. Women smallholders are especially vulnerable as they typically have limited access to production assets and less decision-making authority over their use. They also have less control over their income and time allocation, although they make up at least 70% of labor in coffee and own 19–35% of farms.



#### RESOLUTION

- ✓ Improving and adjusting management of coffee on smallholder and women-owned farms.
- ✓ Scaling up investment in capacity building along the value chain, especially at farm and community level.
- ✓ Investing in gender equality programs for women in coffee and ensuring their representation and participation.





CHAPTER 3

# INSPIRATION FOR CHANGE

## WHAT STRATEGIES CAN BE USED TO INCREASE CLIMATE RESILIENCE?

Despite the challenge in identifying site-specific adaptation options, our analysis identified six strategies that increase climate resilience and are already proving successful in producer countries. For optimum results, as many as possible should be carried out in parallel:

- 1 Further research on the impacts of climate change on coffee
- 2 Site-specific on-farm and processing investments
- 3 Designing and implementing financial mechanisms to facilitate investment
- 4 Investing in adaptation, breeding, and development of more resistant coffee varieties
- 5 Strengthening national development and environmental policies
- 6 Strengthening farmer organizations

# 1

## Further research on the impacts of climate change on coffee

### CURRENT IMPLEMENTATION LEVEL

- **LOW** at farm level and areas affecting companies' balance sheets.
- **MEDIUM** at Research, NGO, and donor community level.

Because of the complexity of climate change, many climate models and future projections are highly uncertain and there can be huge variance at a granular level. By conducting site-specific risk and vulnerability assessments, impacts can be assessed in a standardized manner, so that where uncertainty is high, investments can focus on no- and low-regret options that will deliver benefits.



### Initiatives underway and gaps to fill

Research organizations and sector initiatives are already engaged in climate impact research, but no companies using climate projections for farm-level planning or to inform investments in their value chains have been encountered. For the finance sector, the topic is completely new and not reflected in their risk management.

### Immediate strategies

- Conduct climate risk and vulnerability assessments for key supply regions.
- Invest in updating assessments with high-resolution climate forecasts.
- Identify adaptation options for farmers based on level of severity and vulnerability.
- Invest in and promote adaptation interventions based on available information.

### RESOURCES FOR ACTION

- [coffee&climate toolbox](#)
- Coffee Climate Catalogue section 4.1
- Climate country profiles
- [CIAT climate-smart agriculture resources](#)
- [Step-by-step guide to supporting coffee farmers in adapting in climate change](#) (coffee&climate sourcebook)



## 2

### Site-specific on-farm and processing investments

#### CURRENT IMPLEMENTATION LEVEL

—●— LOW

Farm-level investments in adaptation are the most urgent, but the most difficult to select owing to high levels of uncertainty in the impacts of climate change at the local scale. Promotion and further development of good agricultural practices is critical — including rehabilitation and renovation, which contributes to the economic capacities of farmers. Smallholder farmers are the hardest to reach, and remain largely un- or underfinanced, while large estates and processors are better able to self-finance or access commercial loans at reasonable rates.

#### The following adaptation measures have emerged:

**Good agricultural practices** for soil, water, and pest control can help maintain productivity in the face of suitability loss. Current implementation level can be difficult as it requires access to reliable market prices.

**Shade trees** help regulate the temperature of the coffee trees, provide shelter from wind and rain, and can provide additional income from their harvests.

**Coffee rehabilitation** and renovation involves replacing old trees with more resilient varieties to boost yield and reduce loss. This boost comes at the cost of a high initial investment and drop in income while the trees mature. At the value chain level, investments in breeding new varieties and nursery establishment must precede renovation.

**Crop diversification** is one of the most commonly recommended adaptation measures besides good agricultural practices.



**Shifting from Arabica to Robusta** may be more viable for some farmers than making a geographical or crop shift in the case of land suitability decline. Robusta is often a less financially attractive crop and its cultivation is sometimes legally restricted (Nicaragua).

**Irrigation** can help growers to remain productive in times of water stress, but requires high investment and may be most feasible in countries with good public infrastructure and regulatory environments.

#### Initiatives with high risks

Shifting coffee to higher altitudes may be feasible if agricultural lands are available, but has the potential to drive deforestation and is likely to create negative impacts that outweigh the positive — including land use conflicts and potential deforestation. Re-establishing a farm in a new location is also a very high risk, expensive investment for farmers.

Processing-level adaptations are typically higher and less diverse and often only viable for large estates, aggregators, or other intermediaries with an interest in controlling value addition within their supply chains.



#### Market and finance strategies

- Continue to use certification as a transparency driver and to promote best practice standards.
- Use and expand certification of uncertified actors to access financing by impact and sustainability-oriented investors.
- Use other financial mechanisms to get financing to the farmer and achieve adaptation investments.
- Understand the special vulnerability of women and youth in the coffee value chain by analyzing the issue at producer and all other levels.

#### RESOURCES FOR ACTION

- Coffee Climate Catalogue section 4.2 and Table 2
- [USAID Renovation & Rehabilitation Guidebook](#)



# 3

## Designing and implementing financial mechanisms to facilitate investment

### CURRENT IMPLEMENTATION LEVEL



Financial incentives are key to enhancing investments in sustainable, climate-resilient coffee production. Globally, only few are available, and often lack scale or don't reach the most vulnerable: smallholder and women farmers. Financial risk is highest at the production level, and climate change increases this risk and the need for investments, further widening the financing gap. High transaction costs, a weak credit culture among farmers, lack of collateral and collateral realization on default, and perceived ineffective risk management add to the finance challenge and frequent climatic events disrupt production.

### Successful financing instruments currently in place

**Targeted subsidies** help enhance the purchasing power of smallholders. They have enabled Colombian farmers to renovate with rust-resistant varieties and recover production within four years of the leaf rust outbreak.

**Grant financing** is widely used for all non-revenue generating activities such as capacity building, knowledge transfer and farmer extension services. Pure grant-making mechanisms for climate adaptation are relatively few in the coffee sector and are dominated by donors who offer grants as part of larger financing packages including equity, debt, and concessional sources.



**Loan and equity-based financing** work well for sophisticated, well organized coffee farmers and actors further up the value chain, such as processors and intermediaries. The bulk of smallholders and cooperatives are often excluded owing to lack of financial securities. For these groups, supply chain and concessional lending are better options.

**Supply chain finance** of some sort is offered to farmers by almost all large intermediaries. It is often short term and lacks an adaptation focus but can help reduce financial loss and the cost of inputs and financial services to the farmer while increasing supply security for the buyer.

**Concessional lending** works for a few large companies that qualify as borrowers of Development Finance Institutions (DFI) and can meet due diligence requirements. These actors can set up finance schemes to channel their loans to farmers, often in combination with guarantees.

Generic producer subsidies, risk insurance against losses due to weather extremes, sustainability standards, and financing of specialty coffee have been seen to fail in achieving adaptation or broader sustainability benefits. Certified and Specialty coffee often originates from well managed and more climate resilient farms. However, standards are not the cause but the beneficiary, making them unsuitable instruments to drive change in farming practices.

### Gaps to fill

Coffee is a relatively well financed commodity (as compared to staple crops and cocoa for example), but specific climate finance is lacking. Climate finance has become a buzzword, but there are very few functioning financing mechanisms that reach the final beneficiary, especially in agriculture.

### Immediate strategies

#### Advisory service providers, financial and industry intermediaries, and donors should:

- > Establish farmer finance schemes coupled with technical assistance grants that:
  - Promote the planting of shade trees to achieve both adaptation and GHG mitigation benefits and secure climate funding.
  - Invest in the research and dissemination of pest and climate resilient varieties.
  - Encourage crop diversification.
  - Explore potential for shifting to Robusta production where necessary.
  - Develop crop insurance for smallholders.
  - Invest in irrigation if the necessary wider infrastructure exists.
- > Implement climate change mitigation investments to reduce greenhouse gas emissions from coffee production (e.g. avoided deforestation, reforestation, energy efficiency, fertilizer reduction, etc.).



### Medium-term strategies

#### Banks interested in amplifying their portfolios, industry intermediaries, and donors looking for intermediaries to channel funding to farmers should:

- > Establish partnerships with and capacity building for local financial institutions that cater to rural small and medium enterprises.
- > Train credit officers on credit risk analysis of smallholders.
- > Design financial products specifically for climate change adaptation and mitigation in coffee.
- > Deliver advice and training on all aspects needed to extend seasonal credit to longer term credit.
- > Offer agronomic extension services to borrowers (e.g. farmers) coupled with financial literacy trainings to broaden the client base.
- > Establish monitoring systems to document climate benefits.





## Sustainability and impact

Industry organizations, sector initiatives, and donors should:

- Provide training on sustainability standards, environmental-social and governance risk management systems, as well as climate benefit monitoring procedures to enable more stakeholders to access climate funding in the future.



## Climate finance funds

Donors, accredited agencies and technical delivery entities on the ground who can help agencies develop proposals should:

- Seek strategic partnerships with financing entities that are accredited with the Global Environment Facility.
- Choose partners based on the funding requirements.

### RESOURCES FOR ACTION

- Coffee Climate Catalogue section 4.3
- 'Adaptation highlight' Costa Rica on public sector financing scheme in coffee and climate change
- 'Adaptation highlight' Brazil on rural credit programs

4

## Investing in adaptation, breeding, and development of more resistant coffee varieties

### CURRENT IMPLEMENTATION LEVEL

—●— **MEDIUM TO HIGH** but findings need to reach the farmer

Research to develop new coffee varieties able to withstand hotter, drier temperatures and new pest and disease outbreaks is essential for adapting coffee to climate change. Alongside these new varieties, the sector must also understand which practices enable farmers to maintain productivity and quality in light of climate impacts. Many national and international agricultural research programs are working to develop new varieties of coffee by mapping and preserving genetic diversity and breeding new coffee varieties. These include World Coffee Research's International Multi-Location Variety Trial that facilitates the exchange of Arabica varieties. A similar program for Robusta is expected to start in 2020. The Tropical Agricultural Research and Higher Education Center (CATIE) in Costa Rica is preserving a collection of coffee varieties, and The Royal Botanic Gardens at Kew is working to map and conserve wild coffee varieties.

Other programs such as coffee & climate and the Alliance for Resilient Coffee are working to identify the management practices that are most effective at helping farmers to adapt.

### Gaps to fill

Although there are several initiatives in place, dissemination of best practices and new varieties must improve, especially among farmer groups that are not formally part of established value chains.



## Long-term strategies

R&D organizations, environmental NGOs, governments, and private sector companies should:

- Promote conservation of and/or the establishment of protected areas within the original habitats of wild coffee.
- Support maintenance and expansion of ex-situ gene banks and collections.
- Continue to invest in breeding programs working to develop new varieties that are resistant to pests and diseases and/or heat and drought tolerant.
- Invest in the identification and dissemination of practices that enable farmers to adapt to climate change.





## Research dissemination

To expand the reach of new varieties and practices across the majority of coffee producers, companies, governments, research organizations and NGOs must:

- Invest in the establishment of nurseries for new varieties and support their distribution and adoption among farmers.
- Integrate best practices for renovation, rehabilitation, and other climate-smart practices within national curricula and guidelines, including via national coffee platforms.
- Support programs that train farmers and offer incentives for the adoption of adaptation practices and location-specific solutions across actors and borders.

### RESOURCES FOR ACTION

- Coffee Climate Catalogue section 4.4
- 'Adaptation highlight' Ethiopia on research into the genetic variety of coffee

#### Breeding resources:

- [www.catie.ac.cr](http://www.catie.ac.cr)
- [worldcoffeeresearch.org](http://worldcoffeeresearch.org)

5

## Strengthening national development and environmental policies

### CURRENT IMPLEMENTATION LEVEL

—●— MEDIUM

Numerous national policies reflect the economic importance of coffee for countries, but most do not adequately invest in climate change adaptation to ensure the long-term viability of the sector. While many producing countries have dedicated government institutions for coffee, the level of investment into research, extension, farmer organization and other critical programs is often lacking. In addition, they often focus on production targets at the expense of environmental impacts. The openness of these programs to participation by the private sector and farmers also varies.

The Latin American coffee NAMAs (Nationally Appropriate Mitigation Actions) are frequently cited examples of well planned climate action in the sector, helping farmers to access grants and affordable credit, and to participate in ecologically viable adaptive measures.

In other cases, strong political focus on coffee may have adverse effects on smallholders and the environment. The Uganda Coffee Roadmap and Ethiopia's Green Growth Plan II have both set ambitious quantitative production targets without investing in the necessary financial and institutional capacity investments to reach the millions of smallholders currently growing coffee in these countries, or to empower women in coffee and incentivize youth to remain in coffee farming. As a result, these and other countries may work to reach such targets at the expense of smallholders.



In South and Central America, stringent national policies are in place prohibiting or restricting Robusta cultivation. Other countries have a coffee strategy that focuses on high-value market segments. With climate change, these policies may have to be adjusted to give farmers in areas with declining suitability an alternative.

Private sector contribution to the development of the national coffee sector is highly dependent on a country's degree of liberalization. Where contractual producer-buyer relationships are permitted, companies can directly influence and fund good agronomic practices, including adaptation, but legislation controlling the trade of coffee can also prevent direct relationships between foreign investors and coffee producers.



## Gaps to fill

Although some producing countries have climate adaptation plans and policies for their coffee sector, most do not consider the need for further environmental protections, especially for forests, in light of production targets and changes in climate suitability. In addition, most policies do not adequately plan for or support farmers in diversification efforts, especially in lower altitudes becoming less suitable for coffee.



### RESOURCES FOR ACTION

- Coffee Climate Catalogue section 4.5
- 'Adaptation highlight' Colombia on strengthening farmer organizations
- 'Adaptation highlight' Indonesia on a potential regulatory environment for coffee expansion

## Long-term strategies

Ministries and coffee producer organizations, the private sector, and NGOs can all work together to strengthen national policies and action plans as well as their implementation in producing countries by:

- Supporting the development and implementation of climate adaptation and mitigation policies that incorporate the role of the coffee sector.
- Supporting the development and implementation of agricultural policies that align with climate and environmental priorities.
- Breaking down national climate commitments, pledges, and policies to the coffee sector level.
- Developing and financing collective adaptation and mitigation plans and targets and timelines for the coffee sector.
- Advocating for policies that support climate-resilient, sustainable coffee production and enable private sector support for their implementation.
- Investing in research and programs that support farmers in diversifying production systems, especially in locations becoming less suitable for coffee farming.
- Supporting forest conservation through policies, enforcement, and incentive programs, especially for forest areas becoming more suitable for coffee production.
- Developing and implementing policies and programs that support smallholders at a time of farm consolidation and potential migration from rural areas.

## 6

### Strengthening farmer organizations

#### CURRENT IMPLEMENTATION LEVEL

—●— MEDIUM

Farmer organizations play an important role in the sector — particularly in Central and South America. In Asia (Indonesia and Vietnam) however, such organizations are nearly absent. In Uganda and Ethiopia, producer organizations are growing, but still represent a minor share of farmers. Farmer organizations improve market access of smallholders, can reduce the cost of public extension services, and are an important entry point for private sector engagement. However, substantial external support for organizational development is required before farmer organizations can deliver these services.



### Initiatives underway and gaps to fill

There is plentiful scope to develop strong producer organizations in almost all coffee-producing countries, especially for those with large populations of smallholders.



### Immediate strategies

National governments, development organizations, the private sector, and NGOs can all work together to support the further development of farmer organizations by:

- Investing in and promoting farmer organizations at all levels.
- Supporting women's empowerment within farmer organizations.
- Supporting development and implementation of policies that support farmer organizations.
- Providing low-interest credit to support the growth of farmer organizations.





CHAPTER 4

# FUNDING OPPORTUNITIES

## WHAT FINANCING SOURCES CAN BE LEVERAGED FOR ADAPTATION?

Funding is divided into **public and private sources**. Private sources can be further divided by investor interest on a scale from purely financially driven to purely impact driven. The differentiation has implications for investment volumes, return expectations, risk tolerance, concessions, financial instruments provided, geographic range, and the overall relevance for coffee. Access requirements vary accordingly.

**Loans** constitute the largest part of global climate finance from public as well as private sources — dominated by mitigation finance, mostly for clean energy projects. Some funds are making targeted efforts to increase adaptation measures, as well as the land use portfolios.

Within the small segment of **adaptation lending**, public sources dominate, as there is no clear business case for private lenders or the perceived risk is too high. Commercial banks, for example, are taking on climate finance for adaptation very slowly.



## Four numbers on climate finance and adaptation in agriculture

0.2%

- Credit to agriculture is very low across the globe and stays below 0.2% of all credit in all countries.
- Out of coffee growing nations, Nicaragua has the highest share of agricultural credit with 0.15%.

\$2-6.4 TRILLION

- The financing requirement to address climate change across sectors and countries has been estimated by the latest IPCC report in the range of trillions of USD annually.
- In 2017, total climate finance reached \$463 billion.

4%

- Only 4% of climate finance reaches the agricultural sector.
- The source are mainly development finance institutions.
- The contribution of the private sector has not been estimated.

22%

- Only 22% of climate finance is dedicated to adaptation.
- The percentage of adaptation projects in the agricultural sector is vanishingly small.



# WHAT TYPES OF INVESTORS FUND CLIMATE ADAPTATION?

## Traditional commercial investors

Description:	Interests:	Challenges:
Global, regional, and local commercial banks and micro-finance institutions.	Driven by financial return, with increasing interest in minimizing environmental, social, and governance risks.	Securities and collateral requirements for commercial loans may be difficult for coffee farmers to meet. In some cases, local banks have accepted land titles of cooperative members as loan collateral.

## Sustainability impact investors

Description:	Interests:	Challenges:
Specialized (semi-commercial) microfinance institutions, private equity funds and public-private blended finance credit facilities or funds. Examples currently investing in coffee include Root Capital, Oiko Credit, Eco Enterprises Fund, Althelia, Acumen Fund, Claire Mondial, and EcoBusiness Fund.	Investments that require demonstrated impact on environmental, social and governance (ESG) performance.	Many of the financiers that provide equity and debt limit their equity participation to certain high-impact farming systems, for example agro-forestry.

## Impact-only investors

Description:	Interests:	Challenges:
Publicly financed funds or corporate social responsibility funds by corporates, such as a corporate fund for carbon offsets, coffee supply chain projects, etc.	Social-environmental impact and iconic development stories for their brand, without consideration of financial return.	The high cost of carbon certification, high project development costs that are not offset by financial returns, and finding technical implementers/extension service providers on the ground.

## Public investors

Description:	Interests:	Challenges:
Climate donor funds (such as GEF and GCF); bi- and multilateral development banks channeling these funds.	Delivering high impact measurable solutions at scale.	Funds are only accessible through accredited entities and the complex application process takes months. Borrowers need to be sophisticated enough for the complex environmental, social, governance and impact and monitoring requirements, and projects need to be large enough volume-wise to warrant the high project development costs.

## National public funds

Description:	Interests:	Challenges:
Publicly funded initiatives with potential benefits to the coffee sector.	National climate, agricultural development and rural competitiveness investment programs.	Usually have target geographies and programs. Potentially limited or unclear financing impact at production level.

## Other investor types

Industry intermediaries:
Large intermediaries in the coffee value chain are gaining importance in channeling climate finance and many development finance institutions have started initiatives with them. Aggregators and traders usually have experience in providing input financing or short-term seasonal credit to suppliers, but are not financial intermediaries per se. Roasters and retailers can act as sponsors or guarantors in these deals.



## CHAPTER 5

# CONCLUSION

## LET'S GET BREWING FOR CHANGE

The climate is changing, and for the coffee industry to survive, immediate action is required. Thanks to country analysis using the Climate Impact Chain, we now have a clear direction for moving forward. From this understanding of the current and future impact of climate change in specific locations, industry actors now need to mobilize and promote the adoption of climate adaptation practices to be integrated in day-to-day training activities with farmers – at farm level, beyond farm level, and along the entire value chain.

Following this, continuous further development of management practices and technologies tailored to specific production regions is needed to address the impacts of climate change that vary strongly by location and will continue to evolve. Financing mechanisms, breeding and research, as well as the policy environment are essential for enabling the transition to a sustainable, resilient coffee sector.

But first, coffee... the most lasting change starts from within, and it is up to all sector stakeholders to advocate for the resiliency of coffee, coffee producers, and coffee landscapes.

Where can I read up more about climate adaptation?

- > [coffee&climate Toolbox](#)
- > [Renovation & Rehabilitation for Resilient Coffee Farms: A Guidebook for Roasters, Traders and Supply Chain Partners](#)  
USAID (2017)
- > [Country Data Sheets for Coffee Renovation and Rehabilitation](#)  
USAID (2017)

### Client consortium:

IDH Sustainable Trade Initiative  
Global Coffee Platform  
Specialty Coffee Association  
Initiative for coffee&climate  
implemented by Hanns R. Neumann  
Stiftung  
Conservation International

### Authors:

Dr. Katalin Solymosi and Grit Techel  
from Unique forestry and landuse  
GmbH

### Editor:

Vannessa Inngs

### Designer:

James Cooper, ONIC Design



