Understand, Design, Act: Climate-proof your supply chain

Module 3: How can I manage the effects climate change is having on my supply chain?

28. June 2018
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Danielle Knueppel
Global Coffee Monitoring Program Director
World Coffee Research

Katherine Selengia
Program Manager
Hanns R. Neumann Stiftung
Let’s discuss today

• Understanding how to manage effects of climate change
  • Status of latest research
  • Tools
  • Farming practices

• Questions and Answers
1. Click on “Raise Hand” button
   If you want to comment or ask questions

2. Use the Q&A box
   To place your questions and get feedback from the panelists

3. We will silence your mic
   To avoid undesired background noises. But you can always ask to speak!

4. Remember
   This session is being recorded for archive purposes
Alliance for Resilient Coffee

Climate Catalogue

www.allianceforresilientcoffee.org
Objectives of the Learning Series

- Understand climate change
- Plan, implement, and scale effective CSA
- Learn how to assess your supply chain risks
- Convey the value of investment in CSA

Align your actions

Join concrete action
Opportunities in Honduras and Uganda

Honduras

Platform Agenda

Contribute to National Coffee Platform’s agenda

Multi-stakeholder collaboration

Learnings & results will be shared with the sector

Progress will be measured

Uganda

Climate Change Working Group
The Experts

Celia Harvey  
Conservation International

Daniele Giovannucci  
Committee on Sustainability Assessment (COSA)

Mark Lundy  
International Centre for Tropical Agriculture (CIAT)

Elena Serfilippi  
Committee on Sustainability Assessment (COSA)

Caroline Glowka  
Global Coffee Platform

Danielle Knueppel  
Global Coffee Monitoring Program

Laurence Jassogne  
International Institute for Tropical Agriculture (IITA)

Kealy Sloan  
Sustainable Food Lab

George Watene  
Global Coffee Platform

Kate Selengia  
Hanns R. Neumann Stiftung

Elizabeth Teague  
Root Capital
Module 3: How can I manage the effects climate change is having on my supply chain?

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WHERE WE’RE AT

Learn about the tools, training materials and research that support the implementation of climate smart agriculture at the farm level.

1. Understanding climate change and the coffee sector
2. How is climate change affecting my supply chain?
3. How can I manage the effects climate change is having on my supply chain?
4. How can I scale up CSA?
5. How do I know if my investment in CSA is working?
6. How can I convince my company and others to invest in CSA?
LEARNING OBJECTIVES

How can I manage the effects climate change is having on my supply chain?

• Understand the challenges in managing the effects of climate variability and climate change at the farm level.

• Understand research currently being conducted on CSA practices and strategies, including on resilient varieties

• Understand the c&c approach and toolbox, and how they can be used
CHALLENGES:

If climate is already affecting coffee, why isn’t CSA more widely adopted?
WHAT DOES CSA LOOK LIKE IN PRACTICE?

**Practices**
Implemented on-farm to adapt to current climate variability (and to a lesser extent, prepare for climate change)

- Cover crops
- Shade management
- Distancing
- Trenches

**Strategies**
Implemented on- and off-farm, within the producer organization, community or supply chain, that adapt to current & future climate

- Diversification
- Choosing resilient varieties
- Changing processing methods

**Enablers**
Supported by actors on- and off-farm to establish the conditions needed to implement CSA strategies and to adopt CSA practices

- Financing
- Weather insurance
- Weather stations
- Innovations in payment terms to promote CSA
WHAT DOES CSA LOOK LIKE IN PRACTICE?

### Incremental Change
- **Practices**: Cover crops, fertilizers, etc
- **Strategies**: Organic matter management within the farm, conservation of riparian areas, etc
- **Enablers**: CSA extension, weather stations for better forecasting, carbon insetting, incentives for process & quality, etc

### Systemic Change
- **Practices**: Irrigation, novel varieties, novel soil management, etc
- **Strategies**: On-farm diversification (e.g. new crops for subsistence or commercial use), different processing methods, etc
- **Enablers**: Crop insurance (drought, hail), access to finance to support adaptation, carbon insetting, etc

### Transformative Change
- **Practices**: Switch to Robusta or other crops, etc
- **Strategies**: Moving away from coffee farming, or farming altogether, etc
- **Enablers**: Developing new value chains for new cash crop systems, etc
BUT WHICH PRACTICES, STRATEGIES, & ENABLERS?

- Cash flow
- Appetite for risk
- Reliance on coffee
- Access to:
  - Inputs
  - Equipment
  - Training
  - Weather data
  - Infrastructure
  - Financing

- Altitude
- Slope
- Shade
- Soil type
- Soil cover
- Pests & diseases
- Plant variety
RESEARCH:

What do we already know about which CSA practices and strategies are working? What research is in progress?
Ensuring the future of coffee
By 2050, need to double world production, but suitable land will decline by half.
Global network of trial sites
Regional Breeding Hubs
F1 hybrids
Decision tools
New standards
Using advances in agricultural science, it is possible to dramatically improve coffee yields, coffee quality, climate resilience, and farmer livelihoods.

For example, new F1 hybrid varieties have shown:

- Tolerant to diseases and pests
- 22-46% yield increases
- Capable of scoring 90+
- Climate resilient
- More profit per hectare
It’s not enough
To create new varieties

The best variety in the world doesn’t help the farmer…

• if it’s not tested in local conditions
• if he or she doesn’t know about it
• if it isn’t a good plant
• if he or she isn’t convinced of its value, and can’t get a loan to renovate their farm
The best variety in the world doesn’t do a farmer any good if it’s not tested in local conditions.
1. Build Trust

2. Gather 35 top-performing coffee varieties

3. Replicate in sterile in-vitro environments

4. Send varieties to participating countries

5. Each country plants varieties on test plots

6. Monitor performance under local conditions

7. Selected

7. Best-performing coffees

7. Multiplied

7. Distributed to producers

Research Boosts Global Productivity & Quality
Major frost in Laos
6 February
2.1°C at 7 am

Majority of plants severely damaged—“blackened”

BUT all F1 hybrids (H1, EC15, EC16) were undamaged
The best variety in the world doesn’t do a farmer any good if he or she doesn’t know about it.

First-ever global coffee variety catalog

Online, free, open-source

50,000 people reached in 9 countries

varieties.worldcoffeeresearch.org
**CENTROAMERICANO**

Very high yielding with very good quality potential. Well-adapted for agroforestry.

### Appearance

<table>
<thead>
<tr>
<th>Statute</th>
<th>Leaf Tip Color</th>
<th>Bean Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwarf/Compact</td>
<td>Green</td>
<td>Large</td>
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</table>

### Agronomics

<table>
<thead>
<tr>
<th>Optimal Altitude</th>
<th>Quality Potential at High Altitude</th>
<th>Yield Potential</th>
<th>Nematodes</th>
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<tbody>
<tr>
<td>5°N to 5°S: &gt;1000m</td>
<td>Very Good</td>
<td>Very High</td>
<td>Susceptible</td>
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<td>5–15°N and 5–15°S: &gt;700m</td>
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<td>&gt;15°N and &gt;15°S: &gt;400m</td>
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<td>Coffee Leaf Rust</td>
<td>Coffee Berry Disease (CBD)</td>
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<td>Resistant</td>
<td>Tolerant</td>
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<td><strong>YEAR OF FIRST PRODUCTION</strong></td>
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<td><strong>NUTRITION REQUIREMENT</strong></td>
<td>Very High</td>
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<td><strong>RIpening of Fruit</strong></td>
<td>Average</td>
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<td><strong>CHERRY-TO-GREEN-BEAN OUTFUR</strong></td>
<td>Very High</td>
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<tr>
<td><strong>PLANTING DENSITY</strong></td>
<td>3000-4000 (using single stem pruning)</td>
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<td><strong>ADDITIONAL AGRONOMIC INFORMATION</strong></td>
<td>Requires careful nutrition for roots to become established, avoiding too much nitrogen (N). An important note about F1 hybrids: Seeds taken from hybrid plants <em>will not have the same characteristics as the parent plants.</em> This is called &quot;segregation.&quot; It means that the child plant will not look or behave the same as the parent, with potential losses of yield, disease resistance, quality, or other agronomic performance traits. The variety should only be reproduced through clonal propagation and purchased from trusted nurseries.</td>
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**Genetics**

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<tr>
<th><strong>LINEAGE</strong></th>
<th>T5296 x Rume Sudan</th>
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<tr>
<td><strong>GENETIC DESCRIPTION</strong></td>
<td>F1 Hybrid (Introgressed)</td>
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**Availability**

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<th><strong>BREEDER</strong></th>
<th>CIRAD-CATIE-ICAFE-IHCAFE-PROCAFE-ANACAFE</th>
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<tr>
<td><strong>INTELLECTUAL PROPERTY RIGHTS</strong></td>
<td>This plant is in the public domain in Costa Rica, El Salvador, Guatemala and Honduras; outside of these countries, permission should be requested from PROMECAFE.</td>
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</table>

This variety is available through the WCR Verified™ program.
The best variety in the world doesn’t help the farmer if it isn’t a good plant.

We train and certify nurseries to ensure they are producing genetically pure and healthy plants.
The first global standard to certify that coffee seed producers and plant nurseries are producing healthy and genetically pure plants.
Absolutely. Farmers deserve to be able to trust that they are buying

- Plants that are healthy
- Plants that are genetically correct (the “true” variety)
The best variety in the world doesn’t help the farmer if she or he isn’t convinced of its value, and can’t get a loan to renovate their farm.

Global Coffee Monitoring Program

Test in farmer fields
The Global Coffee Monitoring Program (GCMP) is a network of hundreds of On-Farm Technology Trials (OFTTs)...

Each trial plot is located directly in farmer fields. Producers see and feel the impact of using improved varieties and agronomic practices.
Focus on varieties and realistic, profitable CLIMATE SMART practices

Farmer’s most important assets:
• plants
• soils

But often, varieties are outdated and soils are depleted. Sooner or later this leads to a downward production spiral.

• Consequence… coffee unattractive. Farmers eventually leave coffee farming altogether.

• Adoption of improved varieties and agricultural practices can substantively increase a farm’s profitability, keeping farmers in coffee.
Design of an On-Farm Technology Trial

Trial Size: 1000m² -- 5000m²
Coffee Varieties for OFTTs

- Considerations -- altitude, yield, pest and disease tolerance, cup quality and availability

- Control varieties
  - typically or currently used in farms

- Variety A (national varieties)
  - selected from the most promising, best performing national varieties

- Variety B (regional varieties)
  - the best performing and most promising in the region (i.e., Batian in East Africa)
Examples of Climate Smart Agronomic Treatments

- Appropriate for the type of farm
- Address limitations
- Farmers are interested in testing
- Farmers would continue after the trial
Training and Communication with Partner Agronomists

* WhatsApp Groups to communicate, ask and share
Standardized Data Collection

• Basic farm characteristics
• GPS location
• Socioeconomic data
• Soil analysis and pH
• Daily Temperature and Rainfall

• Field Operations (labor, inputs, costs)
• Early vegetative growth
• Pest and disease
• Yield (output)
• Bean and Cup quality
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**Estimated number of new Arabica OFTTs per Country and Year**

- Robusta OFTTs starting in 2020
Benefits of Participating and Outcomes

Lifting Profitability
Through rigorous monitoring of costs, labor inputs, and yield and price increases for farmers according to different farming systems, the trial will provide unparalleled data for improving farm profitability and helping farmers secure small loans.

Smarter Farming
This network of hundreds of scientifically designed plots will result in significant advances in knowledge about coffee variety performance, soil treatments, and farming practices.

Monitoring Platform
The trial will serve as a global monitoring platform to track the impact of climate change on the quality and production of coffee as well as the movement of diseases and pests around the world.

Global Benefit
For the coffee industry as a whole, the trial will accelerate the adoption of new varieties that are high quality, disease resistant, and higher yielding and will enable investment in large-scale renovation projects. This will provide an overall boost to the global supply of high quality coffee.
SOLUTIONS:

What tools can we use to design and implement a CSA at the farm level?
How can you select the CSA practices, strategies and enablers appropriate for your context?
The initiative for coffee&climate

Launched in 2010 in 4 key producing regions

>35,000 producers reached

>400 extensionists trained
We’ve been working to...

**Understand** which practices and strategies work in which contexts. *(c&c case studies)*

**Share** that information publicly. *(c&c toolbox)*

**Help** producers and producer organizations to select appropriate practices and strategies and implement. *(c&c approach)*
welcome to the c&c toolbox

in response to the needs of coffee farmers, the c&c toolbox was developed as an open online platform to effectively tackle climate change. the c&c toolbox is a compilation of tools, climate maps, case studies, guidelines and further reading materials that equip farmers and farming communities with valuable information. it provides a platform to exchange knowledge on climate and innovative adaptation practices which we develop alongside some of the world's leading climate experts and bridge the gap between science and farmer knowledge.

discover the c&c toolbox and start taking action now.

latest tools and case studies

tool

On-Farm Climate Monitoring
Measuring and recording the soil and air temperature on your farm has become much cheaper, allowing you to monitor temperature and humidity to be measured, e.g. temperature, humidity.

+ case studies + pictures + further information

Case Study - Rainwater Harvesting - Tanzania

= case study - Rainwater Harvesting - Tanzania

+ pictures

+ further information

Monitoring Devices
Because of climate change and increasingly extreme weather events (especially during El Nino) the need to quantify what happens in coffee soils becomes ever more...[+]

+ pictures + further information

Cover Crops
Cover crops refer to a variety of practices that occur to cover bare ground - e.g. grasses, legumes, etc. More information.

= case studies + pictures

+ further information

Gypsum Application to Soil
With certain types of soil, such as those found in the Corrida region of Brazil, application of large quantities of gypsum (calcium sulphate) to the field can be effective.

= case studies + pictures

+ further information

Use of Mycorrhizae in Seedlings and Nursery
Adding mycorrhizae to the soil of seedlings in polyethylene bags for both coffee and shade trees can improve root nutrition, because mycorrhizal fungus feeds on the roots...[+]

= case studies + pictures

+ further information

Biochar
Biochar is another name for charcoal, produced by heating wood or other vegetative-based materials in an oxygen-constrained chamber. The term...[+]

= case studies + pictures

+ further information

Climatic Zoning
For planning purposes it is useful to determine which coffee land can be categorized as optimal, sub-optimal or unsuitable and how these have been changing...[+]

= case studies + pictures

+ further information

Filter by

topics

- climate change
- climate change adaptation
- carbon sequestration
- decision
- diagnostics
- implementation
- management practices
- past痕
- rehabilitation
- risk analysis
- show all topics

climate hazards

- air humidity
- drought
- heat
- spin
- temperature
- winds and cloudiness
- show all climate hazards

countries

- content types
- booklets / brochures
- case studies
- info sheets
Case Studies: measurement indicators & equipment

Stress
Temperature
Relative humidity
Lightness
Vegetative growth
Erosion

Root development: width and length
Temperature of the soil
Soil humidity & fertility
Mortality
Case Study 1: Practice in C. America

Demoplot Location: Sensentí, Ocotepeque, Honduras

Altitude (m.a.s.l.): 900

Age of the plant: 4 years (est. Sept 2012)

Climate hazard: High temperature and drought

Impacts: Poor root and foliage development, poor fruit filling, flower abortion, dead plants

CSA practices:
- Cover crop (Brachiaria)
- Temporary shade (Gandul)
<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Tree Height</th>
<th>Tree Width</th>
<th>Bags of 60kg gb/ha</th>
<th>Quality</th>
<th>Income USD</th>
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**Graph:**
- **Y-axis:** Average soil temp with cover crops
- **X-axis:** Time (January 2015 to May 2016)
- **Colors:**
  - Blue: Avg soil temp w/o cover crops
  - Red: Avg soil temp with cover crops
Case Study 2: Practice in Vietnam

Water-saving irrigation technique in the Central Highlands

No cost to implement, saves $$ on water and fuel

Trialed with 17 farmers and 3 agronomists, scaled with 900+ farmers

All farmers reduced water use by 30%
Case Study 3: Strategy in Tanzania

Conservation agriculture on maize production within coffee farming systems in Mbeya

Trialed with 200 farmers

Results:
- Maintained soil structure by preventing erosion
- Increased yields 25%-100% in first season
- Diversified farmer income, reducing risk of crop failure & ensuring food security
- Spillover of soil conservation practices from coffee e.g. mulching
- Reduced loss of top-soil leads to a long-term perspective for cultivation
Case Study 4: Enabler in Brazil

Weather data collection in 4 communities of Sao Francisco de Paula

4 producers measure daily rainfall & temperature (max. and min.) + weather datasheets (collected monthly and entered into database by technicians).

Results:
- Improved knowledge of local climate & effects on the coffee system
- Development of community-based weather experts
- Technicians compare local data collected with historical weather station data
Increase in adverse climatic events:
- storms
- irregular rainfall
- increasing temperature range
- drought
- high temperatures
- high winds

Impact on coffee production:
- more pests, disease and weeds
- post-harvest risks
- soil erosion
- irregular flowering

Coffee Suitability:
- 45% of area potentially suitable under current conditions may become unsuitable even with adaptation
- 20% will require substantial adaptation to improve resilience
- 35% will only require incremental adaptation to improve resilience

How do we develop a climate adaptation plan?
The c&c approach

• Intro to CC
• CIAT climate maps & country reports
• c&c toolbox

Triangulation:
• Farmer diagnostic
• Focus group discussions
• Climate witness workshops
• Scientific information

• Collection of adaptation options
• Framework for prioritization
• Plan for implementation
• Development of indicators

Cost/benefit analysis
Measurement of adaptive capacity, resilience
Participatory evaluation
Case studies

Farmer Field Schools
On-farm trials (incl OFTTs)
Demonstration plots
Data collection

The c&c approach
Triangulation of risk assessments

- Farmers
- Scientists
- Extensionists
## Adaptation planning

<table>
<thead>
<tr>
<th>Acceptability</th>
<th>Affordability</th>
<th>Timing</th>
<th>Urgency</th>
</tr>
</thead>
<tbody>
<tr>
<td>How open are producers to applying this practice or strategy?</td>
<td>Can the producer afford to apply this practice or strategy? Is there financing available?</td>
<td>How long will this practice or strategy take to yield results?</td>
<td>How urgent is the climate threat to which this practice or strategy responds?</td>
</tr>
</tbody>
</table>
Adoption rates after 2 years

**Tanzania**

- Collecting climate data: 5% (20%) - 94% (100%)
- planting early shade trees: 48% (20%) - 90% (100%)
- mulching: 28% (20%) - 86% (100%)
- cover crops: 21% (20%) - 83% (100%)
- conservation agriculture: 13% (20%) - 76% (100%)
- basins between tree lines: 19% (20%) - 54% (100%)

**Trifinio**

- rust management: 3% (0%) - 91% (100%)
- pH regulation: 9% (0%) - 91% (100%)
- cover crops: 9% (0%) - 78% (100%)
- lime sulphur application: 9% (0%) - 69% (100%)
- broca traps: 18% (0%) - 45% (100%)
- gypsum application: 0% (0%) - 36% (100%)

Source: Farmer field book data 2013 and 2014
We lead a workshop for your extension team, introducing the c&c approach, establishing expectations and deliverables

1 week

Step 1: Setting the Scene
We lead data collection, with support from your team

~1 month (not including development of country climate risk profile)

Step 2: Assessment of climate challenges
We lead field meetings with producers and technicians, with support from your team

~2 months

Step 3: Adaptation planning
We develop adaptation plans with your team and producers

~1 month

Step 4: Adaptation Implementation
Your team leads farmer field schools, demo-plot exchanges and data collection, with backstopping from us

~2 years

Step 5: Lessons learned
We lead assessment and development of case studies, with support from your team and producers

Annually
Why consider this approach within your supply chain?

**Proof of concept:** Evidence-based results (case studies, demo and validation plots)

**Scaleable model:** ToT curriculum, workshop formats, can integrate with existing extension message

**Open source:** Knowledge hub and regional knowledge management mean you continue to benefit from latest findings
WHERE WE’RE HEADED

Learn about innovative ways to “de-risk” CSA for the farmer and the private sector, and the potential for financing approaches to CSA.

1. Understanding climate change and the coffee sector
2. How is climate change affecting my supply chain?
3. How can I manage the effects climate change is having on my supply chain?
4. How can I scale up CSA?
5. How do I know if my investment in CSA is working?
6. How can I convince my company and others to invest in CSA?
RESOURCES

• Coffee&climate toolbox, with Sourcebook and case studies: toolbox.coffeeandclimate.org
• WCR Website: worldcoffeeresearch.org Interactive Variety Catalog: varieties.worldcoffeeresearch.org
• Global Coffee Conservation Strategy: https://worldcoffeeresearch.org/work/global-coffee-strategy/
Q & A
Contact Details

Danielle Knueppel
World Coffee Research
danielle@worldcoffeeresearch.org

Katherine Selengia
Hanns R. Neumann Stiftung
katherine.selengia@hrnstiftung.org
<table>
<thead>
<tr>
<th>Module</th>
<th>Date</th>
<th>Title</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>June 7th</td>
<td>Understanding climate change</td>
<td>Introduction</td>
</tr>
<tr>
<td>2</td>
<td>June 12th</td>
<td>How is climate change affecting my supply chain?</td>
<td>Risk Profiles</td>
</tr>
<tr>
<td>3</td>
<td>June 28th</td>
<td>How can I manage the effects climate change is having on my supply chain?</td>
<td>Tools</td>
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<tr>
<td>4</td>
<td>July 19th</td>
<td>How can I scale up CSA?</td>
<td>Scale</td>
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<td>5</td>
<td>September 27th</td>
<td>How do I know my investment in CSA is working?</td>
<td>Monitoring</td>
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<tr>
<td>6</td>
<td>October 25th</td>
<td>How can I convince my company and others to invest in CSA?</td>
<td>Business Case</td>
</tr>
<tr>
<td>7</td>
<td>November 8th, December 6th</td>
<td>How can collaboration work? Bringing action to origin!</td>
<td>Collaboration</td>
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</tbody>
</table>

Duration: 75 minutes per module  
Time: 3pm CEST | 9am EDT | 6am PDT

Link to [CSA Learning Series](#)
## Participants in Module 3

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization/Company</th>
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<tbody>
<tr>
<td>Alexandre Dutheil</td>
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<tr>
<td>Ana Carsalade</td>
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<tr>
<td>Andreas Kirk</td>
<td>ØNSK</td>
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<tr>
<td>ASELE BENJAMIN</td>
<td>KAWACoM UGANDA LIMITED</td>
</tr>
<tr>
<td>CAROLINA JARAMILLO GIRALDO</td>
<td>Empresa de Pesquisa Agropecuária de Minas Gerais (Epamig-Sudeste)</td>
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<tr>
<td>Chris Davidson</td>
<td>Atlas Coffee Importers</td>
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<tr>
<td>Dorien Van Dun</td>
<td>EFICO NV</td>
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<tr>
<td>Jan von Enden</td>
<td>HRNS North America</td>
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<tr>
<td>Katharina Plassmann</td>
<td>Yara International ASA</td>
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<td>Katrien Delaet</td>
<td>EFICO</td>
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<td>Kim Elena Ionescu</td>
<td>Specialty Coffee Association</td>
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<tr>
<td>Lars Wehmeier</td>
<td>Niehoffs Kaffeerösterei GmbH</td>
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<tr>
<td>Lydia Namutebi</td>
<td>Kawacom Uganda Limited</td>
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<tr>
<td>Marcus Laws</td>
<td>NCBA CLUSA</td>
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<td>Napoleon Molina</td>
<td>Rikolto</td>
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<td>Nicole Gobeth</td>
<td>Solidaridad</td>
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<td>Pablo Ruiz</td>
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<td>Pauline Vaskou</td>
<td>Tesco PLC</td>
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<td>Peter Baker</td>
<td>Climate Edge</td>
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<td>Philip von der Goltz</td>
<td>List + Beisler GmbH</td>
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<tr>
<td>Reena Eddiks</td>
<td>Volcafe</td>
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<tr>
<td>Susan Macdonald</td>
<td>Global Bright Futures</td>
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<tr>
<td>Tessa Meulensteen</td>
<td>IDH</td>
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<tr>
<td>Tharic Galuchi</td>
<td>Imaflora</td>
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<tr>
<td>Thomas Delbar</td>
<td>Supremo</td>
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<tr>
<td>cmahugu</td>
<td>Founder</td>
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