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

Module 2: How is climate change affecting my supply chain?

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Module 2: How is climate change affecting my supply chain?

With:

Mark Lundy
Theme Lead, Sustainable Food Systems
International Centre for Tropical Agriculture

Moderators

Caroline Glowka
Global Coffee Platform

Katherine Selenga
Hanns R. Neumann Stiftung

Kealy Sloan
Sustainable Food Lab
Let’s discuss today

- Online Learning Series
- Understanding Risk Profiles
- 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
GCP partners in 2018

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
Path to Collective Action

- Understanding climate change
- How is climate change affecting my supply chain?
- How can I manage the effects climate change is having on my supply chain?
- How can I scale up CSA?
- How do I know my investment in CSA is working?
- How can I convince my company and others to invest in CSA?
- How can collaboration work? Bringing action to origin!

Modules

- Introduction
- Risk Profiles
- Tools
- Scale
- Monitoring
- Business Case
- Collaboration

+ Climate Catalogue as resource
Opportunities in Honduras and Uganda

**Honduras**

- Platform Agenda

**Uganda**

- Contribute to National Coffee Platform’s agenda
- Multi-stakeholder collaboration
- Learnings & results will be shared with the sector
- Progress will be measured

Climate Change Working Group
Module 2: How is climate change affecting my supply chain?

Marc Lundy
Theme Lead, Sustainable Food Systems
International Centre for Tropical Agriculture
WHERE WE ARE IN THE WEBINAR SERIES

Learn more about the tools and resources available to assess risk and resilience in your supply chain and how to use them for decision-making.

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?
How is climate change affecting my supply chain?

1. Understand how climate change is already affecting coffee production
2. Understand risk profiles and climate suitability maps and how they can be used
3. Understand how to determine farmer resilience in your supply chain
4. Understand how to manage climate risk in relation to farmer resilience
CLIMATE RISKS

Supply
- Future projected production
- Quality / flavor
- Adaptive Capacity

Reputation
- Environmental
- Social
Supply

Future projected production
- Pest and disease pressure
- Aging trees
- Area available for coffee production
- Profitability of coffee

Quality / flavor
- Increasing temperatures
- Changing rainfall
- Increased pests and diseases
- Varieties poorly suited to future climate

Adaptive Capacity
- Enabling environment conditions
- Farmer willingness/capacity to invest in coffee
- Company flexibility in sourcing

Farmer willingness/capacity to invest in coffee
Company flexibility in sourcing
We are already seeing impacts
In Tanzania, every 1°C increase reduces yields by 137 kg/ha
Climate trends vary by space and time

- Precipitation more extreme throughout the year
- Higher temperatures
- Higher evapotranspiration
Key messages:

Climate change impacts are here now.

Climate change varies over space & time. This means tailored adaptation strategies.

Projections based on business as usual (e.g. no action).
So, what can we do?
KEEP CALM AND CARRY ON
Map the impact gradient to understand the risk of climate change over time
- Temperatures will continue to increase.
- Precipitation changes differ by region and global climate models are uncertain.
CONCEPTUAL APPROACH

• Coffee is currently produced under good climatic conditions
• We can learn from these locations and evaluate future data
• Machine learning approach:
  – Complex climate data
  – Missing climate data
  – Insufficient coffee physiological knowledge
  – High future uncertainty of precipitation projections
<table>
<thead>
<tr>
<th>Type</th>
<th>Bioclimatic variables</th>
</tr>
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<tbody>
<tr>
<td><strong>Temperature</strong></td>
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<tr>
<td>BIO 1</td>
<td>Annual mean temperature</td>
</tr>
<tr>
<td>BIO 2</td>
<td>Mean diurnal range (mean of monthly (max temp - min temp)</td>
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<tr>
<td>BIO 3</td>
<td>Isothermality (BIO2/BIO7) (*100)</td>
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<tr>
<td>BIO 4</td>
<td>Temperature seasonality (standard deviation *100)</td>
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<tr>
<td>BIO 5</td>
<td>Max temperature of warmest month</td>
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<tr>
<td>BIO 6</td>
<td>Min temperature of coldest month</td>
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<tr>
<td>BIO 7</td>
<td>Temperature annual range (BIO5-BIO6)</td>
</tr>
<tr>
<td>BIO 8</td>
<td>Mean temperature of wettest quarter</td>
</tr>
<tr>
<td>BIO 9</td>
<td>Mean temperature of driest quarter</td>
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<tr>
<td>BIO 10</td>
<td>Mean temperature of warmest quarter</td>
</tr>
<tr>
<td>BIO 11</td>
<td>Mean temperature of coldest quarter</td>
</tr>
<tr>
<td><strong>Precipitation</strong></td>
<td></td>
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<tr>
<td>BIO 12</td>
<td>Annual precipitation</td>
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<tr>
<td>BIO 13</td>
<td>Precipitation of wettest month</td>
</tr>
<tr>
<td>BIO 14</td>
<td>Precipitation of driest month</td>
</tr>
<tr>
<td>BIO 15</td>
<td>Precipitation seasonality (coefficient of variation)</td>
</tr>
<tr>
<td>BIO 16</td>
<td>Precipitation of wettest quarter</td>
</tr>
<tr>
<td>BIO 17</td>
<td>Precipitation of driest quarter</td>
</tr>
<tr>
<td>BIO 18</td>
<td>Precipitation of warmest quarter</td>
</tr>
<tr>
<td>BIO 19</td>
<td>Precipitation of coldest quarter</td>
</tr>
<tr>
<td>BIO 20</td>
<td>Number of consecutive months &lt; 40mm precipitation</td>
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</tbody>
</table>
RANDOM FORESTS

- A forest is an ensemble of trees. The trees are all slightly different from one another.
- The output is the mean classification
- Very robust against overfitting

Source: Criminisi et al 2013
**Incremental adaptation** where climate is most likely to remain suitable and adaption will be achieved by a change of practices and ideally improved strategies and enablers.

**Systemic adaptation** where climate is most likely to remain suitable but with substantial stress through comprehensive change of practices accompanied by changes of strategy and adequate enablers.

**Transformational adaptation** where climate is likely to make coffee production unfeasible, will require a focus on strategic change and adequate enablers as practices alone may be uneconomical.
Impact Gradient (2050s)
CLIMATE SMART COFFEE IN HONDURAS

Honduras is now the largest coffee producer in Central America. Low cost of production, population growth, and institutional support resulted in an average annual production growth of 6%. Most production is shaded at altitudes above 3000m. Many plantations were recently renovated but remain susceptible to major climate driven diseases.

Coffee production

1/3 of the agricultural production
3.5% of annual gross domestic production
20% foreign exchange related to coffee sector

People, coffee and livelihoods

110,000 families have coffee as primary income
92% of producers are smallholders
85% of coffee producers are associated

Coffee production in Central America

20% Honduras’s exports
90% of coffee production is exported
4% Arabica coffee world’s share

Greenhouse gas emissions (kg CO2 eq.)

Coffee production systems

Shaded monoculture

Unshaded monoculture

Carbon stock in shade trees
Carbon stock in coffee trees
Total carbon stock in coffee system
WHAT IS CLIMATE SMART AGRICULTURE?

Climate Smart Agriculture endeavors to improve the integration of agriculture development and climate responsiveness.

- It’s not about starting from scratch; it’s about reevaluating what you’re doing with a climate lens.
- With multiple goals, there will be trade-offs to manage.
- CSA must be context-specific.
- Vulnerable groups, incl. women, are disproportionately affected by climate. CSA must be inclusive.
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?**

<table>
<thead>
<tr>
<th>Incremental Change</th>
<th>Systemic Change</th>
<th>Transformative Change</th>
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</thead>
<tbody>
<tr>
<td><strong>Practices</strong></td>
<td></td>
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<tr>
<td>Cover crops, fertilizers</td>
<td>Irrigation, novel varieties, novel soil management</td>
<td>Switch to Robusta or other crops</td>
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<tr>
<td><strong>Strategies</strong></td>
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<tr>
<td>Organic matter management within the farm, conservation of riparian areas</td>
<td>On-farm diversification (e.g. new crops for subsistence or commercial use), different processing methods</td>
<td>Moving away from coffee farming, or farming altogether</td>
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<tr>
<td><strong>Enablers</strong></td>
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<tr>
<td>CSA extension, weather stations for better forecasting, carbon insetting, incentives for process &amp; quality</td>
<td>Crop insurance (drought, hail), access to finance to support adaptation, carbon insetting</td>
<td>Developing new value chains for new cash crop systems</td>
</tr>
</tbody>
</table>
**INCREMENTAL CHANGE**

**FARMER**
- Cover crops, fertilizers, GAP

**PRODUCER ORGANIZATION**
- Good governance, transparent pricing & payment mechanisms, extension & credit
- CSA adapted extension services, improved processing & post harvest, access to adapted germplasm

**TRADER**
- Good governance, transparent pricing & payment mechanisms
- Product differentiation, carbon insetting

**ROASTER**
- Traceability, transparent pricing & payment mechanisms
- Product differentiation, carbon insetting

**Practices**
- Organic matter management within the farm, conservation of riparian areas
- CSA extension, weather stations for better forecasting, carbon insetting, incentivizing process vs quality

**Strategies**
- Quality differentials, cupping labs, CSA credit (R&R), access to adapted germplasm (WCR), weather stations information, knowledge management
- Price differentials, access to adapted germplasm (WCR), information, knowledge management

**Enablers**
- Consistent price differentials, earmarks for WCR, information & knowledge management, transparent trade & payment processes
**SYSTEMIC CHANGE**

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

**PRODUCER ORGANIZATION**
- Practices: Good governance, transparent pricing & payment mechanisms, extension & credit
- Strategies: CSA adapted extension services, low-water processing, access to adapted germplasm, product diversification
- Enablers: Adapted germplasm (WCR), weather stations information, knowledge management

**TRADER**
- Practices: Good governance, transparent pricing & payment mechanisms
- Strategies: Process-based differentiation (i.e. voluntary certifications), carbon insetting, volume incentives
- Enablers: Access to adapted germplasm (WCR), information, knowledge management, crop insurance (drought, hail), access to finance to support adaptation

**ROASTER**
- Practices: Traceability, transparent pricing & payment mechanisms
- Strategies: Process-based differentiation (i.e. voluntary certifications), carbon insetting
- Enablers: Earmarks for WCR, information & knowledge management, transparent trade & payment processes, carbon insetting
TRANSFORMATIVE CHANGE

FARMER
- Switch to robusta, better adapted non-coffee crops

PRODUCER ORGANIZATION
- Good governance, transparent pricing & payment mechanisms, extension & credit for non-coffee crops
- Identify new crop options, provide access to technologies and training, build new commercial relationships

TRADER
- Good governance, transparent pricing & payment mechanisms for non-coffee crops
- Identify new commercially viable crops to replace coffee
- Market information, commercial contacts with non-coffee buyers, access to adapted production technologies, credit and crop insurance

ROASTER
- Market information, commercial contacts with non-coffee buyers, access to adapted production technologies, credit and crop insurance
- Good governance, transparent pricing & payment mechanisms for declining / disappearing coffee production
- Traceability, transparent pricing & payment mechanisms for non-coffee crops
- Diversify coffee sourcing regions
- Information on other viable coffee regions for quantity and quality requirements

Practices
- Diversify livelihood strategies away from farming or out of farming entirely

Strategies
- Developing new value chains for new cash crop systems

Enablers
- Good governance, transparent pricing & payment mechanisms for non-coffee crops
In conclusion

Take action now to minimize impacts.

Combine scientific insights with business incentives along the value chain.

Partnerships are critical.

Resilience is a long-term process.
WHERE WE’RE HEADED

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

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Resources


https://www.allianceforresilientcoffee.org/

Contact:
cbunn@cgiar.org
m.lundy@cgiar.org
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<th>Module</th>
<th>Date</th>
<th>Title</th>
<th>Link</th>
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<tbody>
<tr>
<td>1</td>
<td>June 7th</td>
<td>Understanding climate change</td>
<td></td>
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<tr>
<td>2</td>
<td>June 12th</td>
<td>How is climate change affecting my supply chain?</td>
<td></td>
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<tr>
<td>3</td>
<td>June 28th</td>
<td>How can I manage the effects climate change is having on my supply chain?</td>
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<td>4</td>
<td>July 19th</td>
<td>How can I scale up CSA?</td>
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<td>5</td>
<td>September 27th</td>
<td>How do I know my investment in CSA is working?</td>
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<td>6</td>
<td>October 25th</td>
<td>How can I convince my company and others to invest in CSA?</td>
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<td>7</td>
<td>November 8th</td>
<td>How can collaboration work? Bringing action to origin!</td>
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**Duration:** 75 minutes per module  
**Time:** 3pm CEST | 9am EDT | 6am PDT  

Link to [CSA Learning Series](#)
Particpants in Module 2

Lieke Guinee
Katharina von Knobloch
Carolin Ehrensperger
Pablo Fernandez Kolb
Fernando Rodriguez-Camayo
Peter Baker
Joel Castro
Daniele
Elena Serfilippi
Lina Alejandra Lozano
Elsebeth Nordlund
Pedro Gonzalez
Susan Macdonald
Kerstin Linne
Tessa Meulensteen
Jenny Kwan

Agri-Logic
ALDI SüD
Bernhard Rothfos
CIAT
Climate Edge
COHONDUCAFE
COSA
COSA
Expocafé S.A.
Fairtrade America
FNC
Global Bright Futures
Green Line Consulting
IDH
IDH Sustainable Trade Initiative
Lydia Namutebi
ASELE BENJAMIN
Philip von der Goltz
Nora Johnson
Marcus Laws
Marcelo Burity
Wouter De Smet
Lars Wehmeier
Brenda Makona
Angela pelaez
Napoleon Molina
Dominique Mvunabandi
Solidaridad Colombia
samuel.ricardo@supracafe.com
Thomas Delbar
Elizabeth Newman
Ana Carsalade
Christian Kamburow
Kawacom Uganda Limited
KAWACoM UGNADA LIMITED
List + Beisler GmbH
Massimo Zanetti Beverage USA
NCBA CLUSA
Nestle
Nestle ZAOA
Niehoffs Kaffeerösterei GmbH
Olam Tanzania Limited
Rgc coffee
Rikolto
Severe Weather Consult Ltd
Solidaridad
SUPRACAFE
Supremo
USAID
CSA Learning Series

Kealy Sloan
Sustainable Food Lab
ksloan@sustainablefood.org

Katherine Selengia
Hanns R. Neumann Stiftung
katherine.selengia@hrnstiftung.org

Caroline Glowka
Global Coffee Platform
glowka@globalcoffeeprogram.org