

# AGROECOLOGY, FOOD JUSTICE & FOOD SYSTEMS CHANGE at SCU

tUrn4, April 23rd, 5:00pm-6:15pm

Dr. Chris Bacon, Chloe Gentile-Montgomery, Benjamin Grundy, Julia Jenak, Emma McCurry,  
Paige Whittaker, Erica Martinez, Skyler Kriese, Gabi Ballardo,



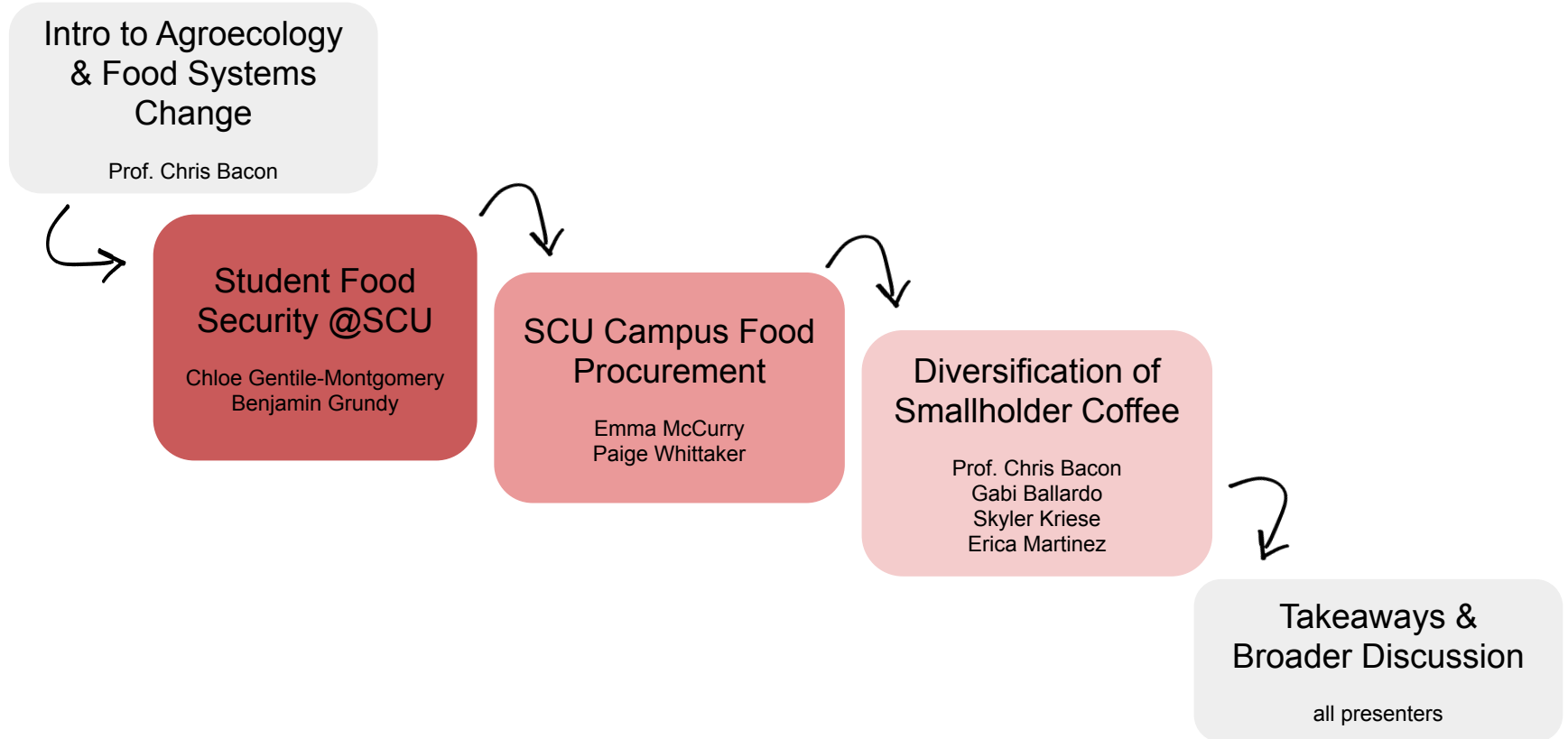
SANTA CLARA UNIVERSITY  
**Environmental Justice  
and the Common Good**



**Center for Food Innovation  
and Entrepreneurship**



# Session Agenda



# Goals

1. Explain relationships connecting food systems to climate change & environmental injustice, and inspire action for food sovereignty.
2. Identify strategies to reduce food system impacts on climate change (“mitigation”), and build climate resilience (“adaptation”).
3. Share student experiences of collaboration, co-learning, and the conduct of critical yet action-oriented research identifying obstacles and opportunities for incremental and transformational changes.





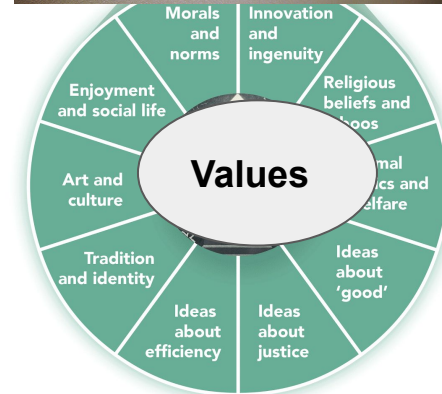
# **Intro to Agroecology & Food Systems Change**

Dr. Chris Bacon

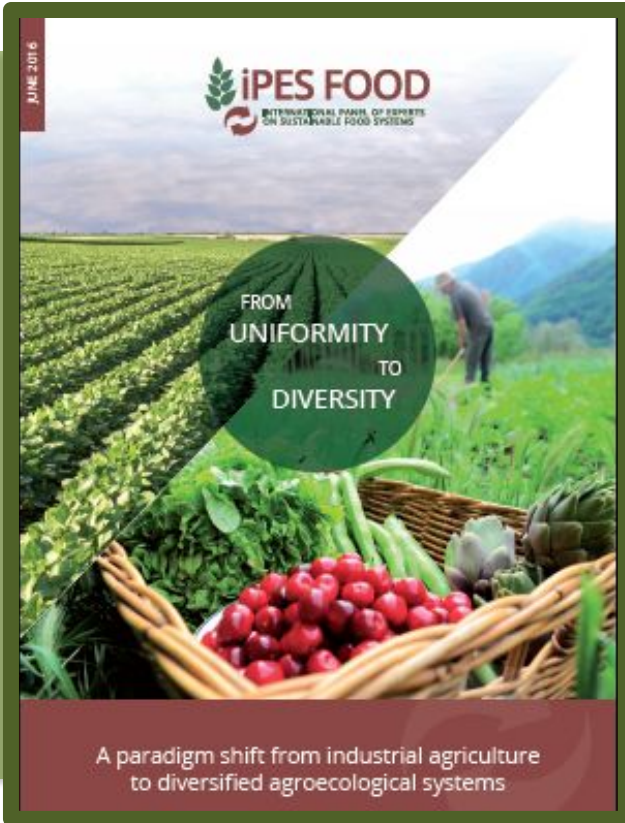


# Food connects people, planet, and values

social values & ideas in the food system  
relationships, ethics, culture, justice, and more



# The Challenge

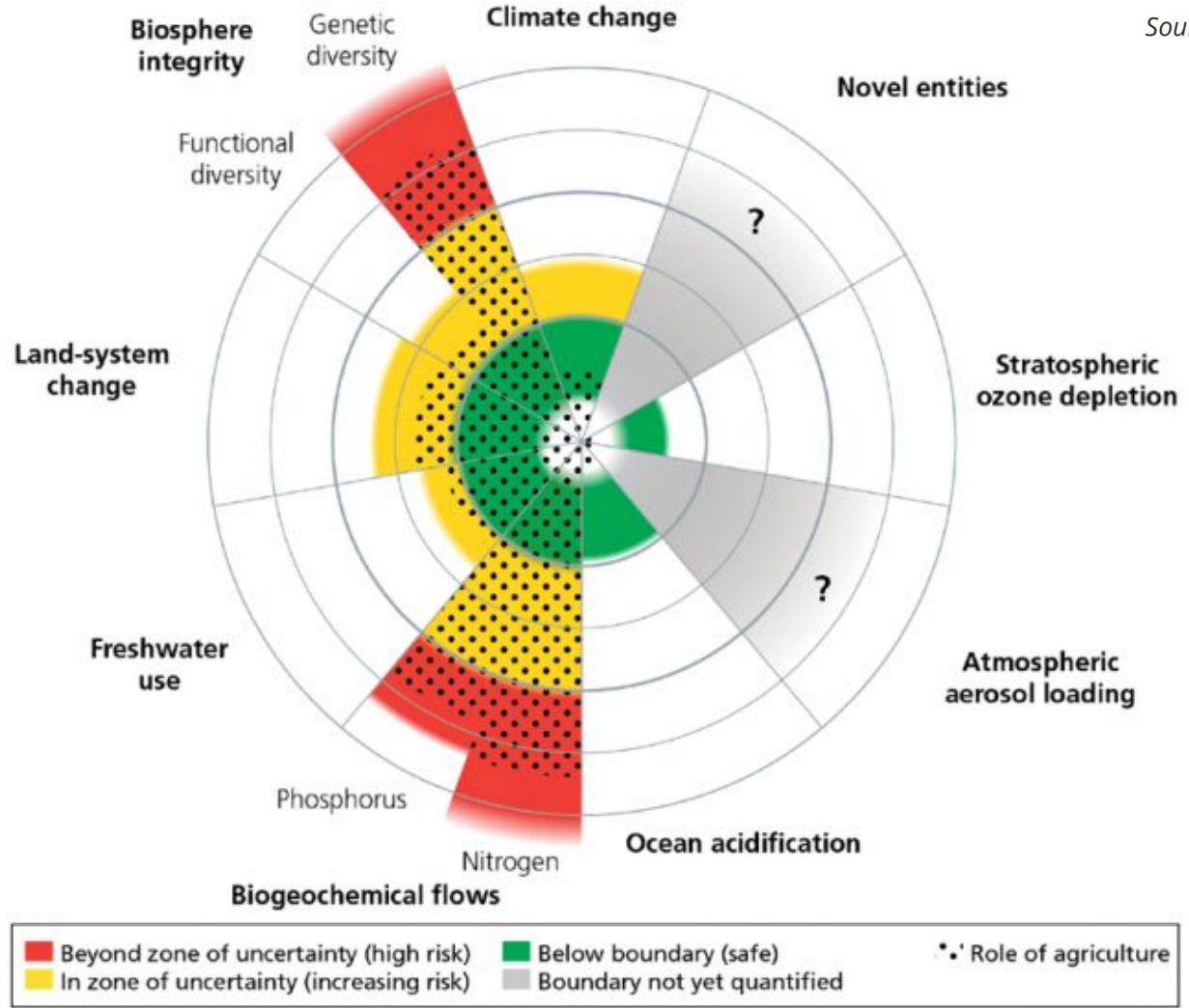


Food systems contribute about 1/3 of global greenhouse gas emissions;

Influences about 40% of all land, and 20% of it is now degraded;

35% of global crops dependent on pollination threatened by combination of extinction of wild species and application of insecticides;

Around 2 billion people suffer from micronutrient deficiencies; current food systems produce an abundance of energy-rich, nutrient-poor crops.





## PRE-PANDEMIC - A BROKEN FOOD SYSTEM FOR TOO MANY PEOPLE

- High costs of housing and transit
- Silicon Valley's residents already struggling to meet their basic needs.
- Disproportionately affected some segments of the population,

## COVID-19 MAKES IT WORSE

- Record unemployment
- Higher food prices
- Increased hunger disproportionate impacts based on income and race.

Nearly  $\frac{1}{3}$  of all Silicon Valley households did not earn enough money in 2018 to meet their basic needs without public or private/informal assistance.

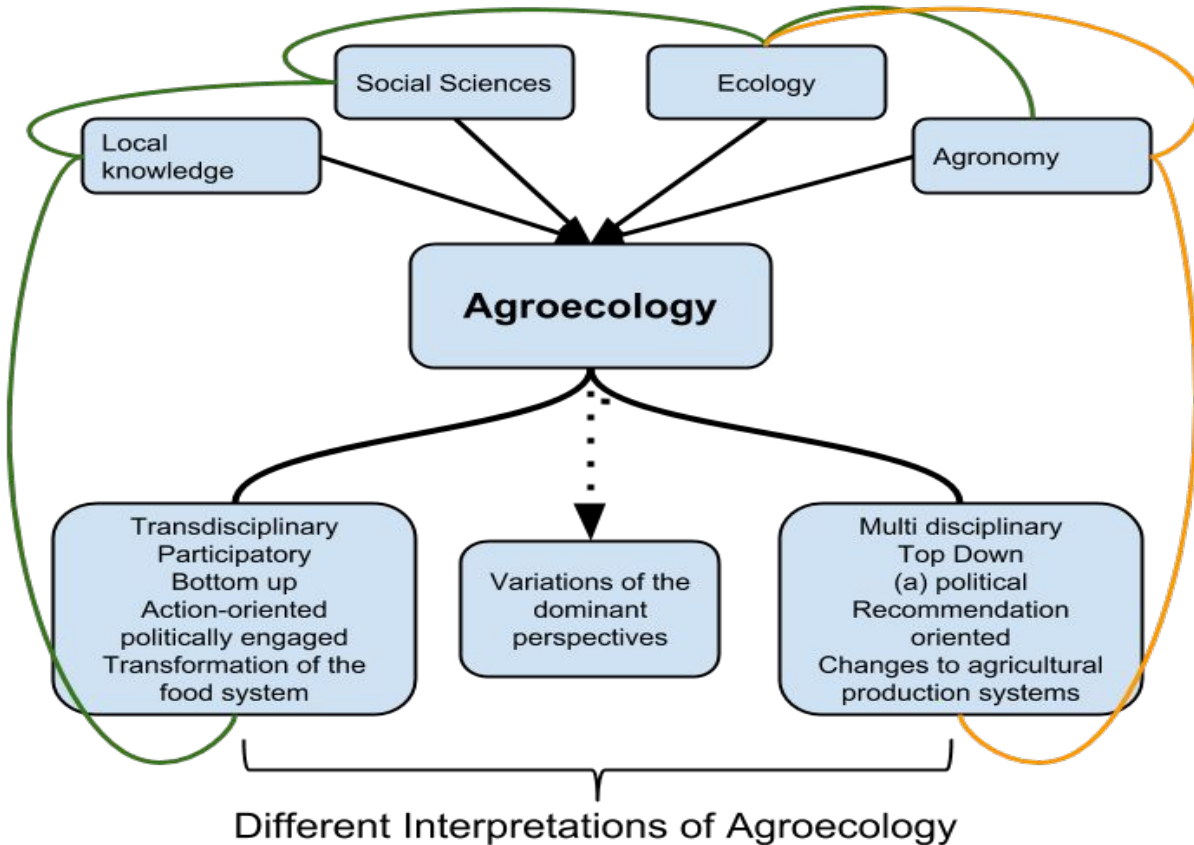
Source: [Silicon Valley Institute for Regional Studies](#) 2020

Indicators of Food Insecurity <i>Santa Clara &amp; San Mateo Counties, and California</i>		
	Pre-COVID (Dec. 2018)	COVID (April 23 – May 19)
California	10.2%	21.8%
San Mateo County	5.5%	16.7%
Santa Clara County	6.4%	16.7%

Sources: Diane Schanzenbach, Northwestern University Institute for Policy Research (prepared for California Association of Food Banks)

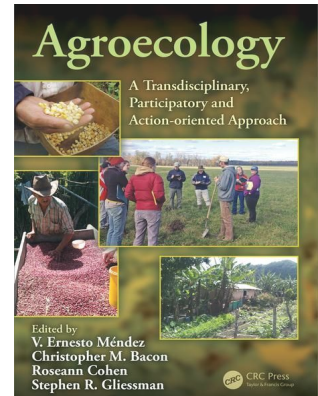
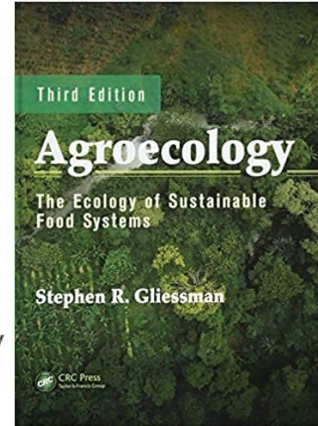
Silicon Valley food insecurity rose by as much as 11 percentage points in early spring, 2020, compared to December 2018.

# An Approach to Agroecology



Feedback loops active in transdisciplinary agroecology

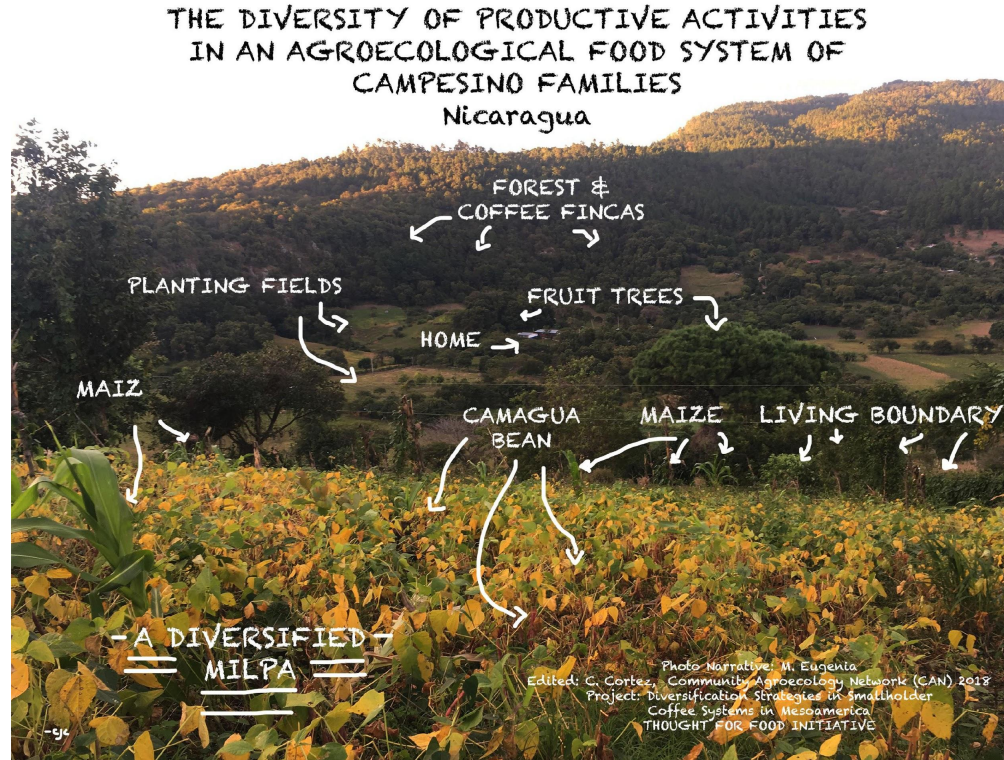
Feedback loops active in multi-disciplinary agroecology



# Agroecology

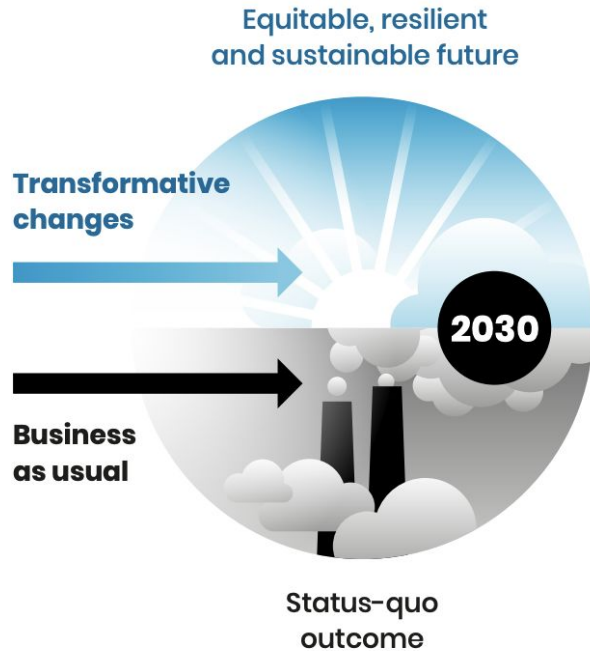
**Agroecology** is a way of redesigning food systems, from the farm to the table, with a goal of achieving ecological, economic, and social sustainability.

Through transdisciplinary, participatory, and change-oriented research and action, agroecology links together science, practice, and movements focused on food systems change (Gliessman 2016)





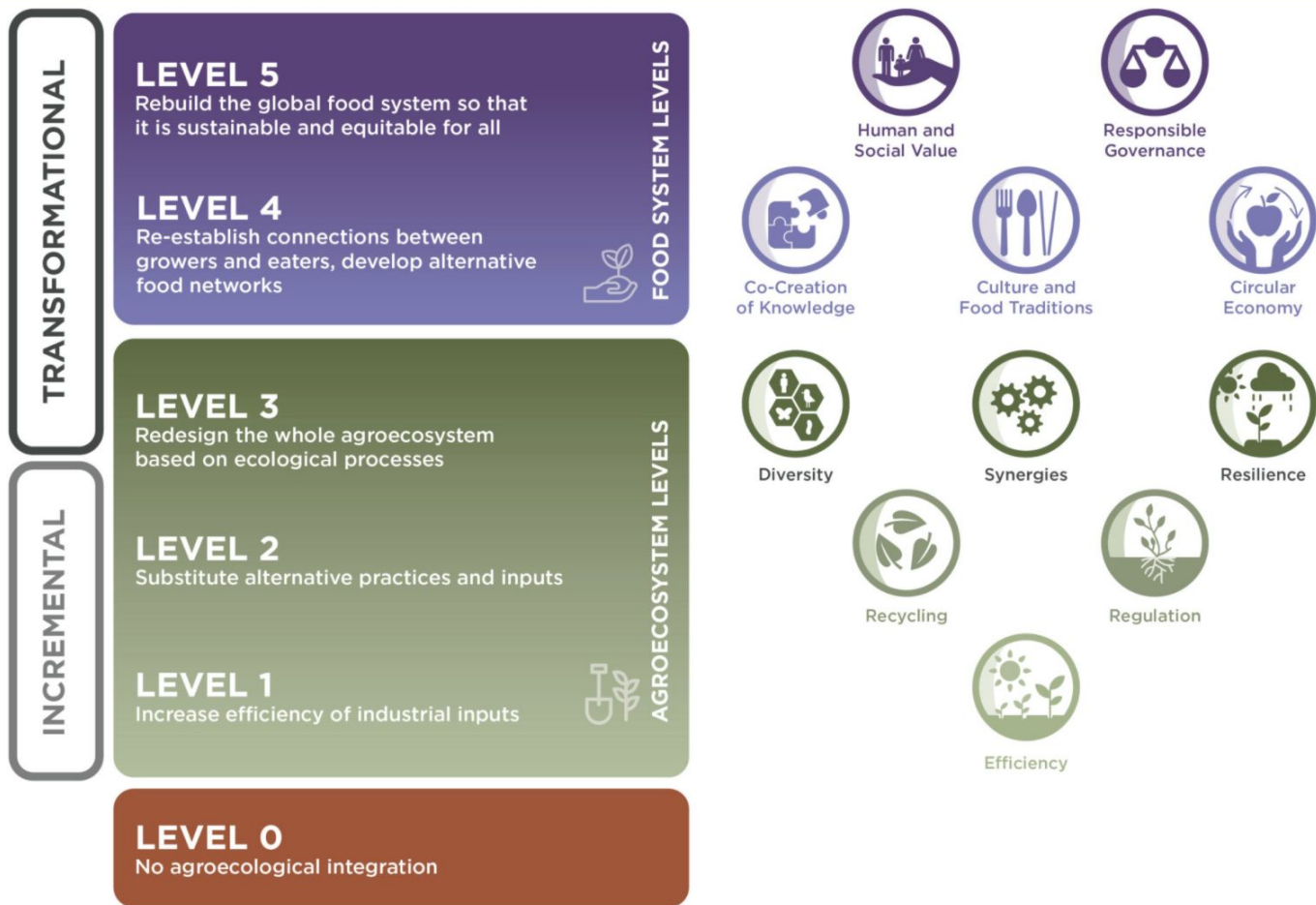
# Food systems change or transformation?



# What kind of change?

- No change
- Backslide
- Incremental (positive) changes
  - Quick wins
  - Best buys
- Transformational changes
  - Re-thinking and remaking relationships
  - Building new food pathways

# 5 LEVELS OF FOOD SYSTEM CHANGE AND 10+ ELEMENTS OF AGROECOLOGY



Overview of the 5 levels of food system change and the elements of agroecology

# WHAT TYPES OF CHANGES ARE LIKELY TO BUILD FOOD JUSTICE & FOOD SOVEREIGNTY

**Inequality, equality,  
equity and justice**



**Inequality**



**Equality**



**Equity**



**Justice**



# Food Justice

*The right of communities everywhere to produce, process, distribute, access, and eat good food regardless of race, class, gender, ethnicity, citizenship, ability, religion, or community (Institute for Agriculture and Trade Policy, 2012)*

***Food Justice** happens when in community we exercise our right to grow, sell, and eat culturally appropriate, fresh, nutritious, and accessible food; cultivated locally while caring for the well-being of the earth, workers, and animals. (La Mesa Verde, 2019)*



## SOUTH BAY FOOD JUSTICE WORKSHOP



**MARCH 6, 2020**

SANTA CLARA UNIVERSITY  
SANTA CLARA, CA

# Food sovereignty

***Food sovereignty*** is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations; and it defends the interests and inclusion of the next generation.



(Shared by Valle Verde, originally from Declaration of Nyéléni, the first global forum on food sovereignty, Mali, 2007. More info:

<http://usfoodsovereigntyalliance.org/what-is-food-sovereignty/>



# Community-Based Participatory Action Research Cycles

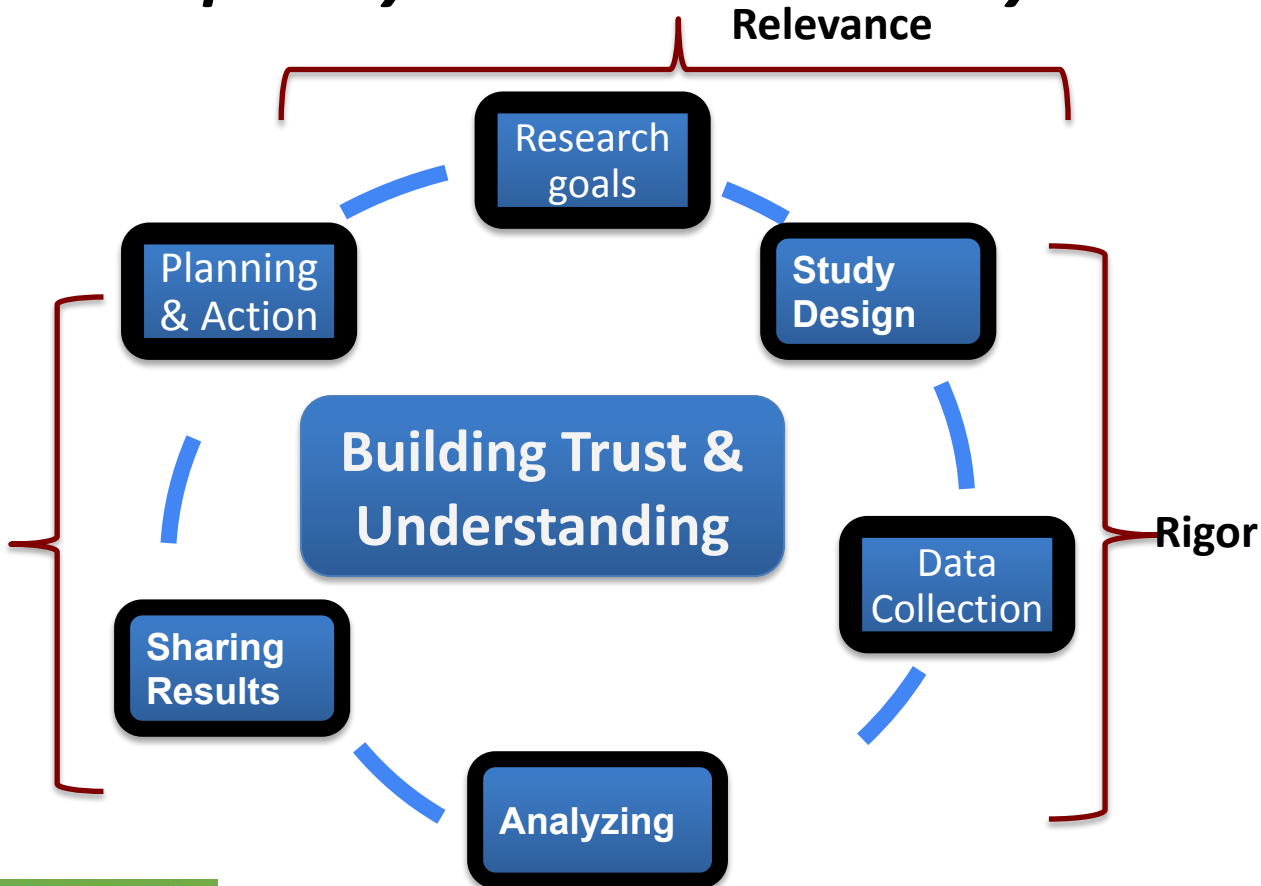
## Context

- Our local community
- Our global community

## Who are our partners?

- Cooperatives
- Universities
- Students
- Farmers

Reach





# Student co-learning and mentoring





# Student Food Security and Sovereignty at SCU

Chloe Gentile-Montgomery, Benjamin Grundy, & Julia Jenak



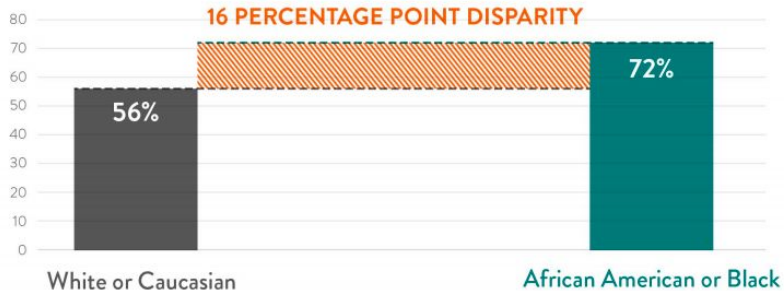
# Student Food Security at SCU

- **38%** of students attending 4-year institutions of higher ed are **experiencing food insecurity**
  - The **COVID-19 pandemic significantly exacerbated student food insecurity on college campuses**
- These challenges are heightened by persistent patterns of **racial and economic disparities among students** and by **social stigmas** that limit discussions of potential responses

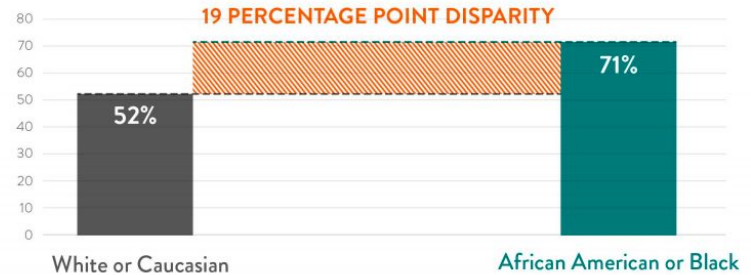


# Broader Issue - COVID Exacerbates Disparities in basic needs insecurity in nationwide surveys

## BASIC NEEDS INSECURITY FALL 2019



## BASIC NEEDS INSECURITY PANDEMIC



Source: Goldrick-Rab, et. al. (2020a) “Emergency Aid During the Pandemic” Data from a national survey of primarily 4 year public universities.

\*Basic needs insecurity includes food and housing insecurity

Respond at [PollEv.com/bengrundy331](https://poll-ev.com/bengrundy331)

Text **BENGRUNDY331** to **22333** once to join, then text your message

## **Food Insecurity Means . . .**

**True or False: All of your food needs have been met  
by Santa Clara University**

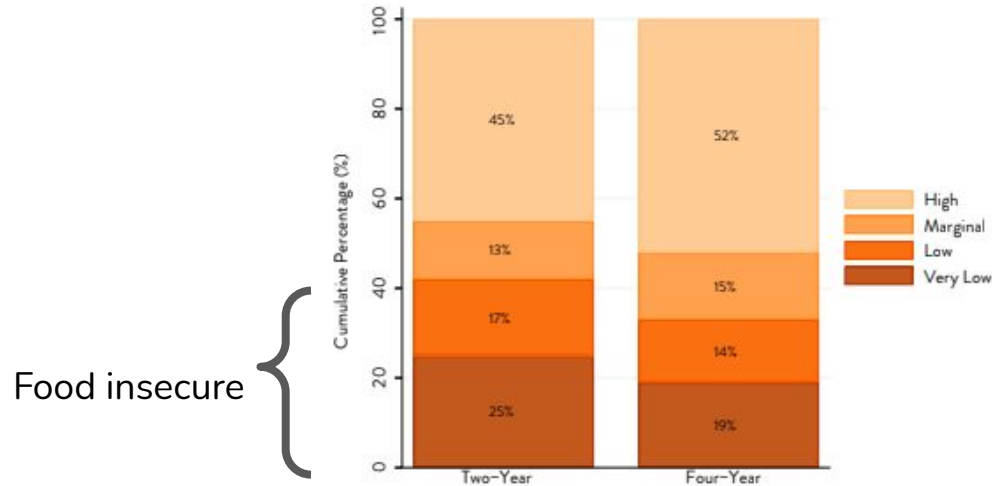
**Have you heard of the Bronco Food Pantry?**



# The Broader Issue

- Food insecurity poses threats to educational success
  - Physical and mental health worsens
  - Grades often suffer
    - Can result in further consequences such as loss of scholarship
  - Could impact completion rate
- **The problem has not been systematically studied at Santa Clara University**

FIGURE 5. Food Security Among Survey Respondents by Sector



Source: Baker-Smith, et. al. (2020a). "#RealCollege2020: Five Years of Evidence on Campus Basic-Needs insecurity during the Pandemic.

# Motivation & Research Questions

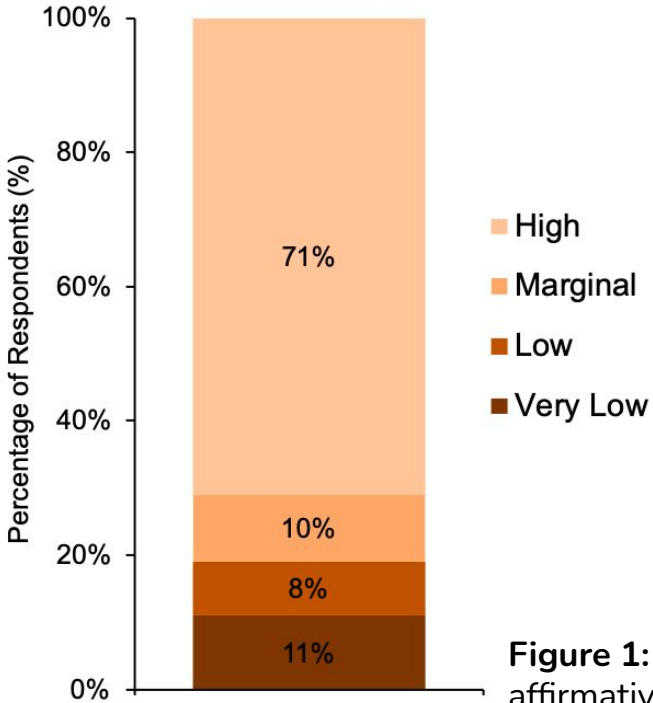
We set out to evaluate the presences of Food insecurity on our campus and recommend strategies for minimizing its impact on students.

1. What are current levels of student food and basic needs security and are there demographic disparities?
2. What are student perceptions regarding the current campus food system?
3. What lessons can be learned and shared from student food security initiatives that have worked to support students at other Jesuit universities in the US?

# Methods



# Food Security Findings Among Survey Respondents



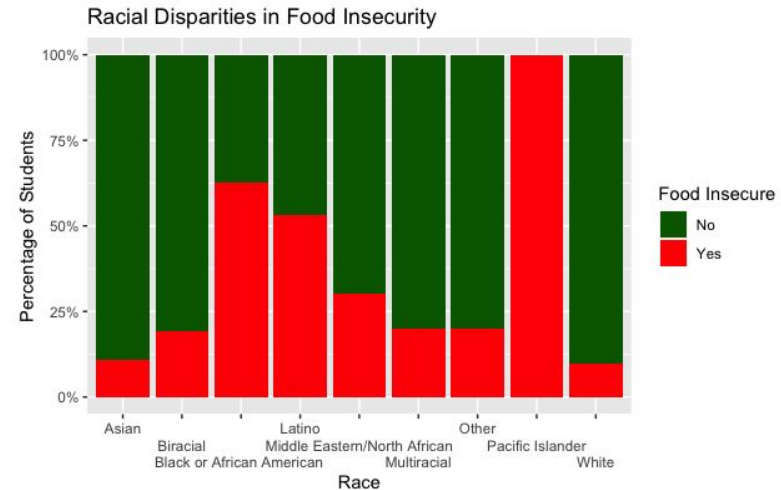
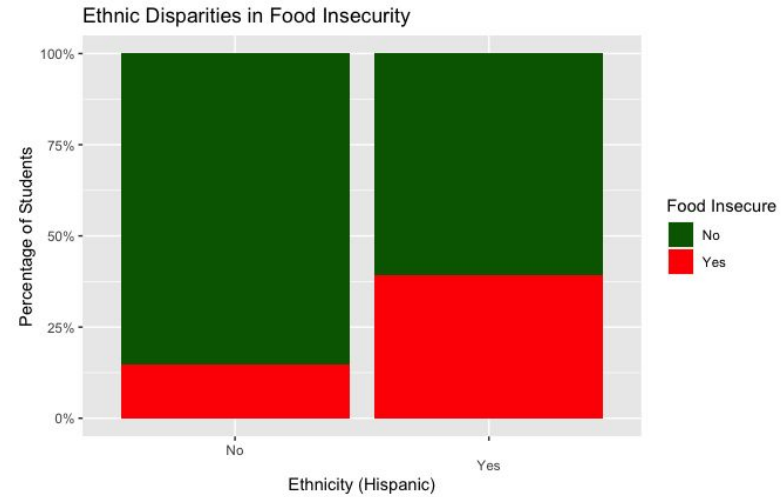
**19%** (102 of 558) of respondents are considered **food insecure** (low and very low food security), an additional **10%** (58 of 558) **are at risk** of becoming food insecure (marginal food security).

Despite these levels of food insecurity, **less than 30% of respondents** are aware of the SCU Food Insecurity Program

**Figure 1:** (n=558) Food security scores were calculated using the number of affirmative answers provided by the respondents to 10 questions regarding food in the past 30 days. Each score corresponds to a food security level, with low and very low levels indicating food insecurity.

# Findings (continued)

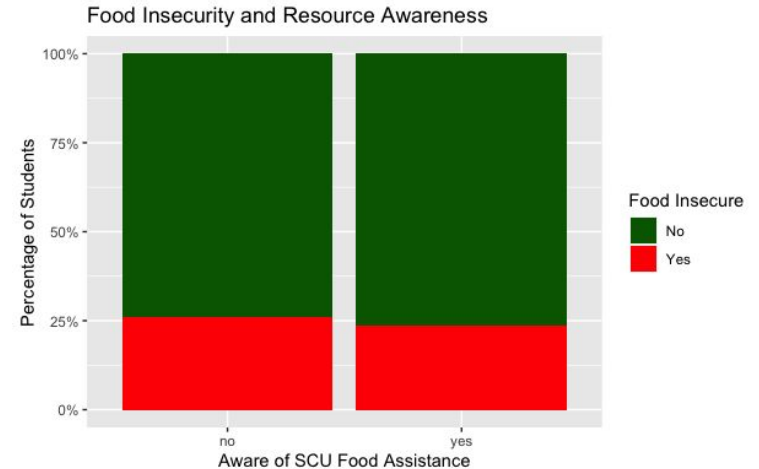
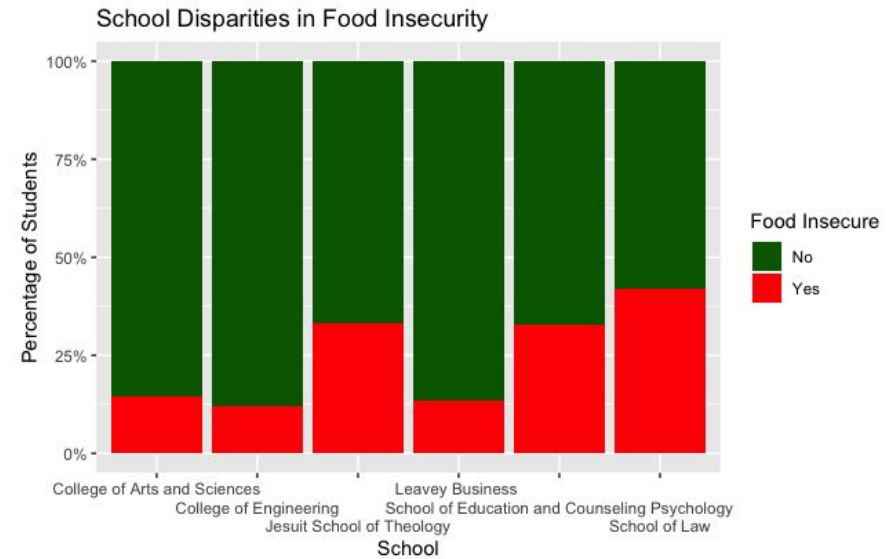
- **Hispanic students** are more likely to self-report food insecurity while having attended SCU ( $\chi^2$  GOF,  $df=1$ ,  $n=471$ ,  $p<0.001$ )
- Students that identified as **Black or African American, Latinx, or Pacific Islander** were most likely to be food insecure



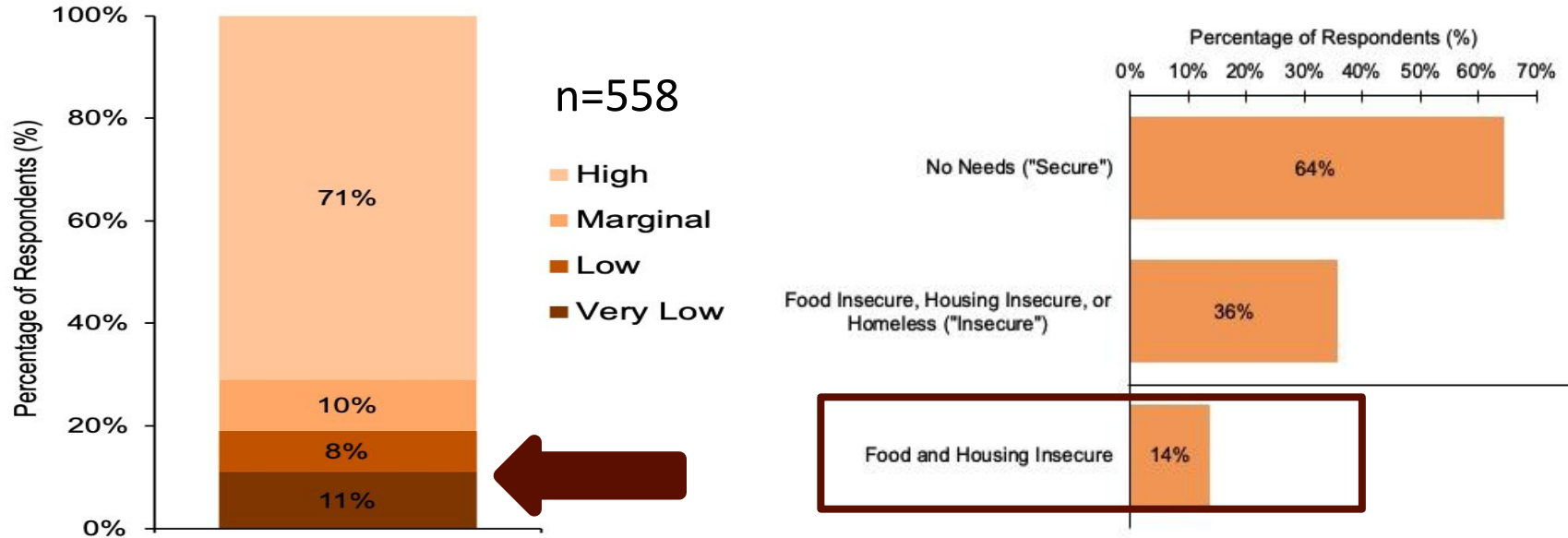


## Findings (continued)

- Graduate students were **more likely to experience food insecurity** than undergraduates
- **More than 25%** of students that self-identified as food insecure **were unaware of the SCU Food Insecurity Program**



# Food & Housing Security Levels Among Survey Respondents



**31%** (173 of 558) of respondents experienced **housing insecurity** in the past 12 months. **14%** (79 of 558) of respondents experienced both food and housing insecurity.

**29%** (130 of 453) of respondents reported a change in their housing situation due to **Covid-19**.

# Results - Interview Analysis

“I think there is a stigma [around food insecurity] because I would never feel comfortable telling anyone at Santa Clara.”

“I feel like it's difficult to ask for help. It's difficult to say that you're struggling in all senses.”

“I feel like food insecurity is inherently tied to your class status, and if your class is something that you don't want to talk about, it's very hard to talk about not having food.”

“I also think that like on campus, when I was exposed to people who are food insecure, it was mostly like frat guys who were having older guys like steal their Benson points . . .”

“It's a normalized thing to run out of meal points.”



# Concluding Takeaways



## Incremental Changes

- We recommend **increased and permanent funding** to the SCU Food Security Program (which houses the Bronco Food Pantry) in order to increase support to students in need
- Campaign to increase student awareness of food-related assistance available
- Food security statement on syllabi
- Donate to food pantries and donate extra meal points
- Yearly basic-needs assessments of this kind

## Transformational Changes

- Increase student financial aid packages and increase estimated cost of attendance
- Reassess the university's relationship with Bon Appetit when it comes to meeting diverse students' needs and supporting staff
  - students are not supportive of the corporation and it is not meeting student needs
  - switching away from a point system for meals
- Rewrite housing contracts to provide year-long options and create emergency housing plans



# SCU Campus Food System:

Real Food Challenge & Climate Emissions Analysis

Emma McCurry & Paige Whittaker



# Project Background

- Food Systems Fellowship @SCU Center for Sustainability
  - History of student-led campus food systems activism
  - First year tracking climate emissions
- Between then and now: continued analysis



# Methods: The Real Food Challenge (RFC)

- Food justice-oriented, student-run, national organization
- Real food “truly nourishes”
  - Local
  - Ecologically Sound
  - Fair Trade
  - Humane
- Over 80 campuses involved... and growing!



# EUTROPHICATION PROCESS



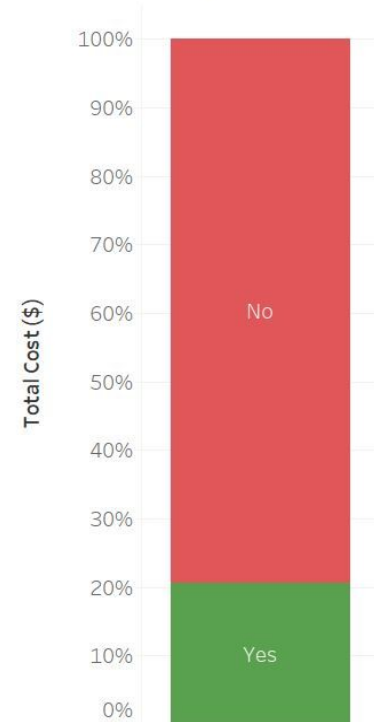
# Methods: Scenario Calculations



# Findings: Real Food Analysis

- Total Real Food % = **21.68%**
  - ( $\pm 2.35\%$  margin of error)
- Largest RF% Expenditures by Category
  - produce, fish, poultry, dairy, and beverages
- **Informal Traction:**
  - Involving students in the Center for Sustainability
  - Discussion Framework
  - Forum for meeting with food system administrators and university actors
- **Formal Traction**
  - “Campus Commitment”
  - multi-stakeholder “Food Systems Working Group.”

Real Food Percent of Total Cost





# Findings: Carbon Emissions



Total emissions:  
~4,680 metric tons

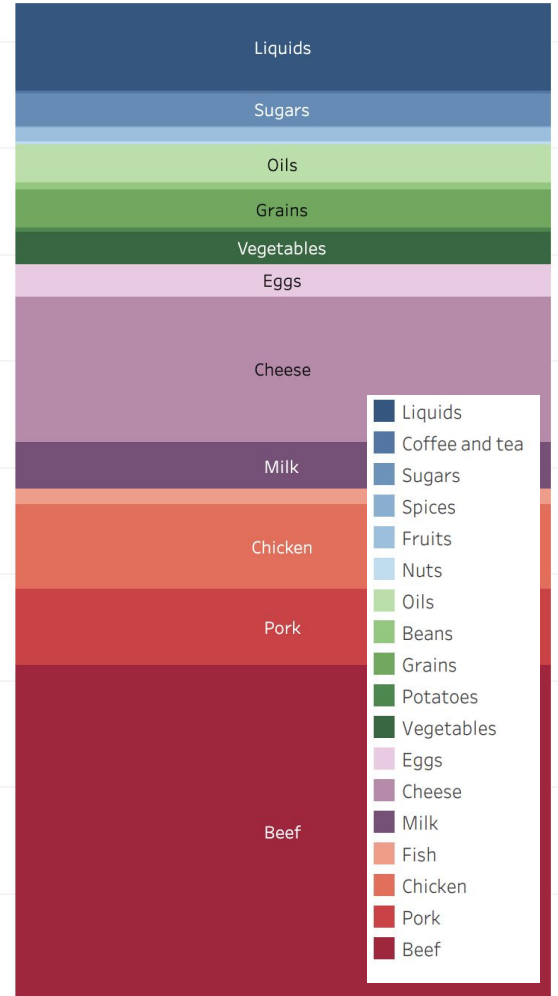
81.33% from animal  
sources\*



\*only 25% of food purchased  
by weight are animal products

Carbon Emissions (kg)

4500K  
4000K  
3500K  
3000K  
2500K  
2000K  
1500K  
1000K  
500K  
0K



# Findings: Nitrogen Emissions

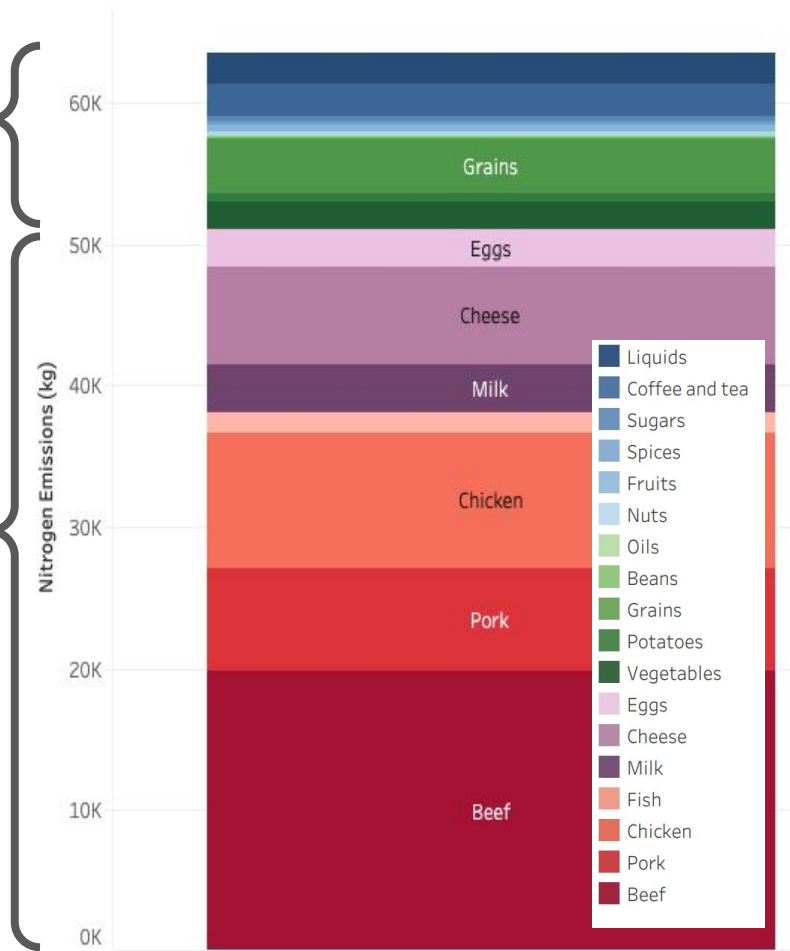


Total emissions:  
63.5 metric tons

88.72% from animal  
sources\*



\*only 25% of food purchases  
by weight are animal products



# Analysis: Scenario Calculations

Projected Impacts of Product Shift Scenarios on Real Food Challenge Results and Greenhouse Gas Emission Profile at Santa Clara University				
Scenario	% Change in Real Food	% Change in CO <sub>2</sub> Emissions	% Change in N Emissions	% Change in Cost Estimate
<i>Current (Reference Case)</i>	--	--	--	--
<i>1. Switch all milk to current Real-qualifying local vendor</i>	+1.38%	negligible	negligible	+0.16%
<i>2. Implement "Meatless Monday" (Replace 14% of animal protein)</i>	+1.42%	-4.83%	-5.72%	-1.10%
<i>3. Utilize "Protein Flip" (Replace 50% of animal protein)</i>	+5.26%	-20.81%	-25.30%	-3.87%
<i>4. Vegetarian dining halls (Replace 100% of animal protein)</i>	+10.97%	-37.96%	-44.89%	-7.73%
<i>5. Source all produce from small &amp; medium-sized local farms</i>	+9.31%	negligible	negligible	+2.94%
<i>6. Become a Fair Trade University through fair coffee and chocolate</i>	+2.43%	negligible	negligible	+0.61%

# Analysis: Food Procurement

## Recommendations for SCU:

- Choose local and organic bakery items
- Switch to fair-trade coffee, sugar, and tea, source from humane dairies
- Promote plant-based purchasing
- Reduce purchasing of ultra-processed, conventional snack foods and beverages

## Policy and Process Recommendations

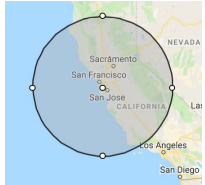
- **Generate momentum with administration** by signing an RFC Campus Commitment and forming a Food Systems Working Group with stakeholders from across the food system (students, dining managers and employees, faculty members)
- **Foster collaboration** between researchers and food system administrators to both ease data collection and make any resulting product recommendations more reputable.



# Usefulness of Metrics



# SIMAP



Measure metrics that make sense to analytical "bottom line" actors



Transitivity of findings across contexts, replicability, "scientific value"



Measure metrics that make sense to people



Usefulness/positive impact within the context



# Share your thoughts!

Given what we've shared thus far and your own experience...

Which of the following can you imagine yourself doing to support sustainable, ethical food systems? Share in the chat!!



- A. Purchase organic, fair trade, or humanely (“Real”) certified food from your local grocery store
- B. Replace some of your animal-based proteins with plant-based products
- C. Purchase in-season produce from your local farmer’s market or CSA
- D. Involve yourself in local food systems-based advocacy





# Concluding Takeaways & Reflections

- ✓ The impact of food choices on climate emissions
- ✓ Institutions = bridge between the personal and the collective
- ✓ Celebrate food!



## Transformational Changes

Connecting farmers & eaters directly  
Eating 100% plant-based diets  
Supporting smallholder farms  
Create forums for engaging in the system (FSWG, student-led co-op)

## Incremental Changes

“Vote with your dollar”  
Plant-forward & plant-based diets  
Supporting larger organizations focused on regenerative agriculture

# Acknowledgements & References

We gratefully acknowledge the following individuals for their invaluable contributions to this project:

- Dr. Christopher Bacon of the Environmental Studies and Sciences Department
- Lindsey Kalkbrenner, Director, Center for Sustainability
- Robin Reynolds, Associate Vice President, Auxiliary Services
- The Dining Services team at SCU: Thierry Bourroux, Laurry Wailes, Janine Palmer, and Michael Brinkman
- Bon Appetit Management Company: Nicole Tocco Cardwell
- Allison Leach, Doctoral Candidate, University of New Hampshire

## Key links:

[1] <https://www.realfoodchallenge.org/>

[2] <https://unhsimap.org/home>

[3] The Center for Sustainability, Santa Clara University, <https://www.scu.edu/sustainability/>

[4] Center for Food Innovation and Entrepreneurship, Santa Clara University, <https://www.scu.edu/business/cfie/>



# Diversification Strategies in Coffee Systems in Nicaragua

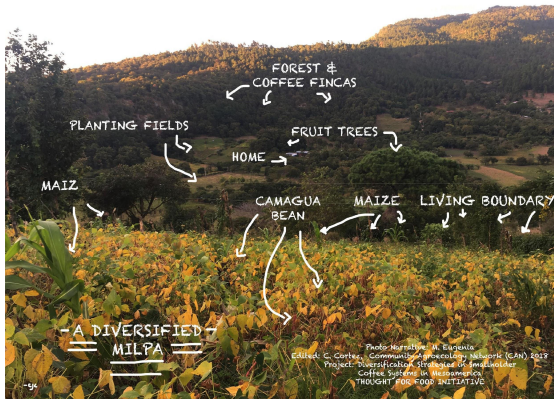
Chris Bacon, Gabi Ballardo, Skyler Kriese, Erica Martinez





# Diversification Strategies in coffee systems in Nicaragua

Prof. Chris Bacon  
 Gabi Ballardo  
 Skyler Kriese  
 Erica Martinez  
 Emma McCurry



Members of project team also include: UVM: Martha Caswell, V. Ernesto Mendez, Alejandra Guzman Luna, Janica Anderzen; SCU: Vanessa Shin and Gabi Ballardo; CAN Rose Cohen, Maria Eugenia Flores Gomez, Carmen Cortez, Cynthia Ramirez; PRODECOOP: Misael Rivas and Ruddy Espinosa; CSMACH: Rigoberto Hernández; ECOSUR: Omar Argüello, Mateo Mier y Tera and, Bruce Ferguson; UNA: Francisco Salmeron, Álvaro Nicolás Benavides González, Henry Alberto Duarte Canales, and Josué Rocha



*Which diversification strategies are most likely to contribute to food security, gender equity, and climate resilience?*





# Methods & Timeline



Reflection

2017

Inception meetings

2018

1st cross-site learning exchange in Nicaragua

2019

2nd Cross-site learning exchange in Mexico

2020

Ph2 community data validation

Posters & Presentations given at Academic & Industry Conferences

Anderzén et al. 2020.

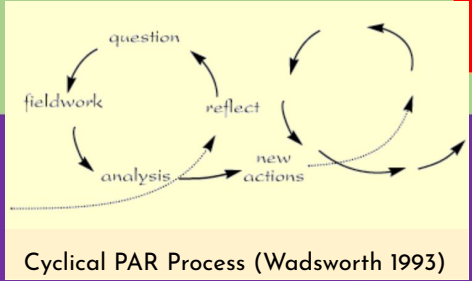
Bacon, et al. (2021 published); Rhiney, Guido, Bacon et al. in review

Research

Phase 1: Baseline > 160 surveys

Ph2: On-farm monitoring of 50 households  
Focus groups, workshops, events  
Popular education tools

Hurricanes Eta & Iota



Political unrest in Nicaragua

Three PhDs

Undergrad Thesis 35, 3 Masters

Global pandemic

Guzmán Luna & Bacon et al. (in prep)

Action

- Seed guardians
- Producers experimenters

Co-op led Agroecology & Food Security Strategic Plan

Farm Resilience Plans

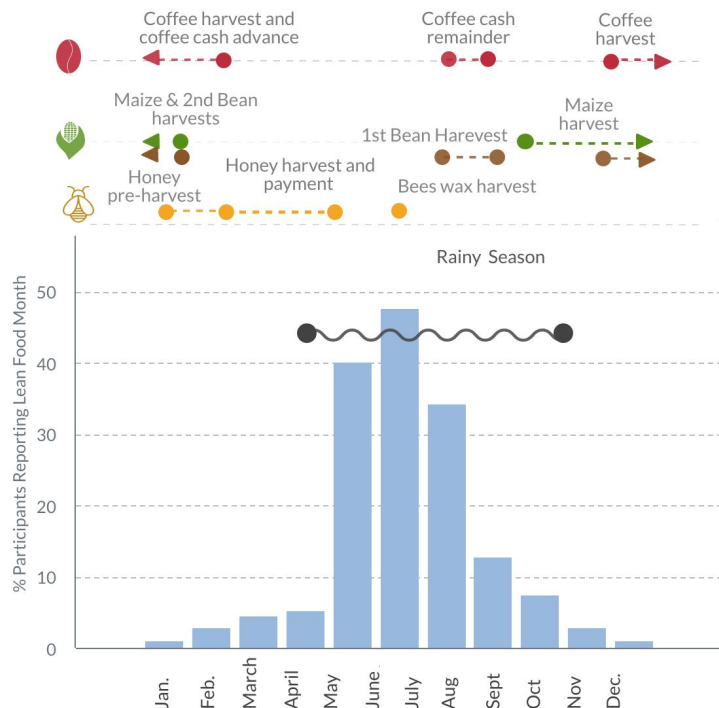
On-going capacitation of the local team of promoters/facilitators

- Nicaragua
- Mexico
- Both Countries

# In Nicaragua - Community-based Research Team



# Food insecurity as correlated with the agricultural calendar



Source: Survey of 172 Farmers in 2017.

World Development 143 (2021) 105468  
<https://doi.org/10.1016/j.worlddev.2021.105468>

Contents lists available at ScienceDirect

**World Development**

journal homepage: [www.elsevier.com/locate/worlddev](http://www.elsevier.com/locate/worlddev)

Dec

---

Place  
Com  
Child  
Religi  
Off F

**Towards smallholder food and water security: Climate variability in the context of multiple livelihood hazards in Nicaragua**

Christopher M. Bacon<sup>a,\*</sup>, William A. Sundstrom<sup>b</sup>, Iris T. Stewart<sup>c</sup>, Ed Maurer<sup>e</sup>, Lisa C. Kelley<sup>f,g</sup>

<sup>a</sup>Department of Environmental Studies and Sciences, Santa Clara University, United States  
<sup>b</sup>Department of Economics, Santa Clara University, United States  
<sup>c</sup>Department of Environmental Studies and Sciences, Santa Clara University, United States  
<sup>d</sup>Civil, Environmental and Sustainable Engineering, Santa Clara University, United States  
<sup>e</sup>Department Geography and Environmental Sciences, United States  
<sup>f</sup>University of Colorado, Denver, United States

Check for updates

---

Coffe  
Nurse  
Fertili  
Harve  
Milpa  
Plow  
Fertili  
Corn  
Plant  
Fertili  
Bean  
Cucu  
Cucu

ARTICLE INFO

*Article history:*  
 Accepted 4 March 2021  
 Available online 8 April 2021

*Keywords:*  
 Climate Change  
 Vulnerability  
 Agriculture  
 Central America  
 Adaptive Capacity  
 Livelihoods

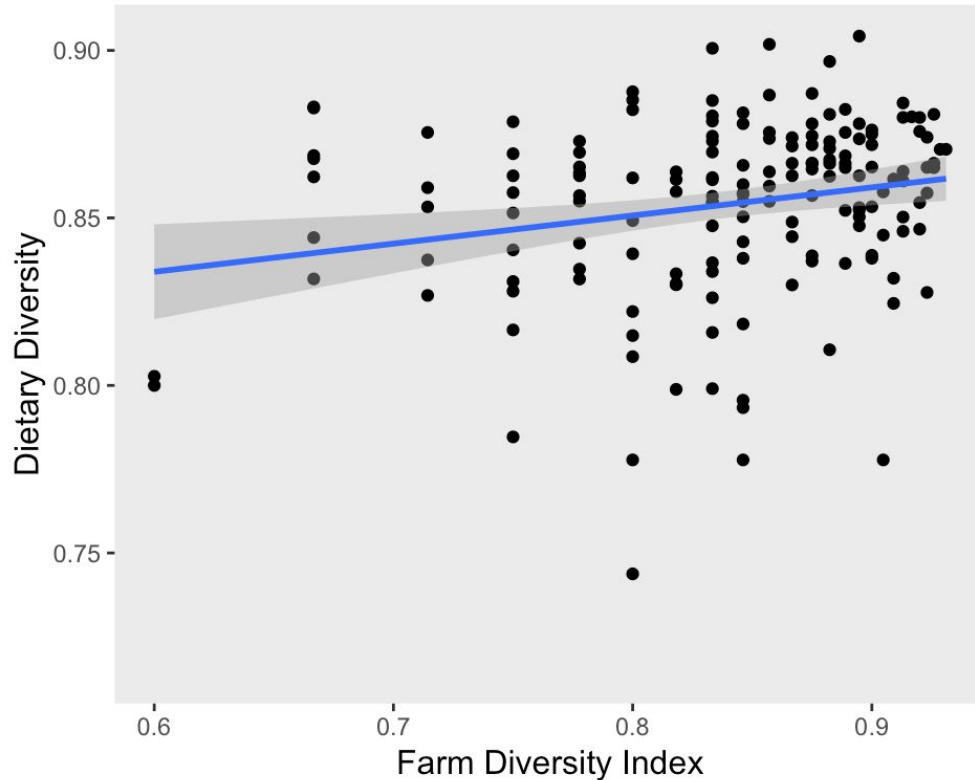
ABSTRACT

Climate variability and change affect both food and water security, as do other hazards, such as shifting food prices, plant pathogens, and political economic changes. Although household food and water insecurity affect billions, most studies analyze them separately. This article develops a relational approach to explaining household access to food and water in a multi-hazard context. We identify pathways linking hazards to livelihood vulnerability and assess the relative importance of climate-related hazards. Analyzing longitudinal data collected from two surveys of the same 311 smallholder households in northern Nicaragua, conducted in 2014 and again in 2017, we find that peak seasons of food and water stress are asynchronous across the agricultural calendar, resulting in a total of five to six months of food and/or water stress. Across households, we find a significant positive relationship between water and food insecurity, even after adjusting for household fixed effects. Households experienced less food and water insecurity in 2017 than in 2014, due in part to the end of a severe drought in 2016, but remained concerned about damage from a severe coffee leaf rust outbreak and unfavorable agrifood prices that reduce income and threaten food security. Higher incomes and larger farm areas correlated with improved food and water security. We propose a generalizable approach for the joint assessment of household food and water security, which foregrounds the influence of seasonality and climate variability in the context of multiple hazards. This approach and our findings can contribute to developing integrated risk reduction strategies, building resilient livelihoods, and informing policy changes and partnerships with organized smallholders to improve resource access and sovereignty.

© 2021 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

# SELECTED RESULTS: Nicaragua

Correlating production diversity with household dietary diversity (n=172)



## Significant Correlates

Less Lean Months

1. Total farm area
2. Total income

Higher Dietary Diversity

1. Farm Diversity
2. Total Income
3. Fewer lean months

## Comparison of groups

- Replicated groups from Mx study found no significant results for lean months or diet.
- Co-op defined 5 groups - Diverse Coffee, Specialized Coffee, Milpa, Homegardens, and Beekeepers. (Beekeepers report higher incomes, and more dietary diversity vs. Diverse Coffee).



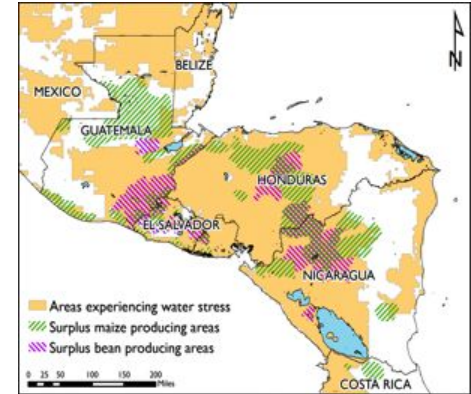
# Climate Injustices & Multi-hazard Environments in Central America



1998 Hurricane Mitch



2011- Coffee Leaf Rust



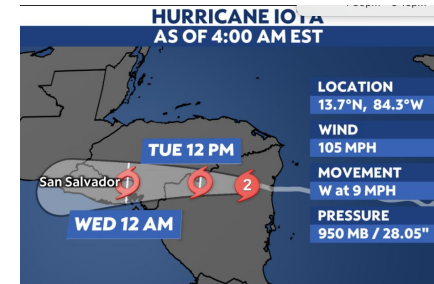
2014 -2016, 2019 Droughts



2014 - Domestic Bean Prices Spike



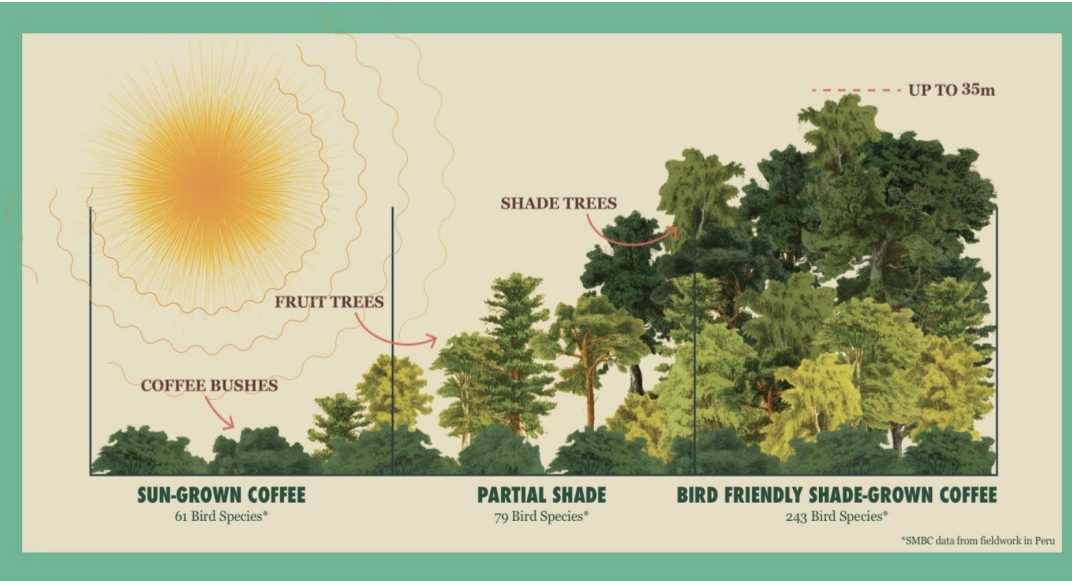
Political unrest 2018



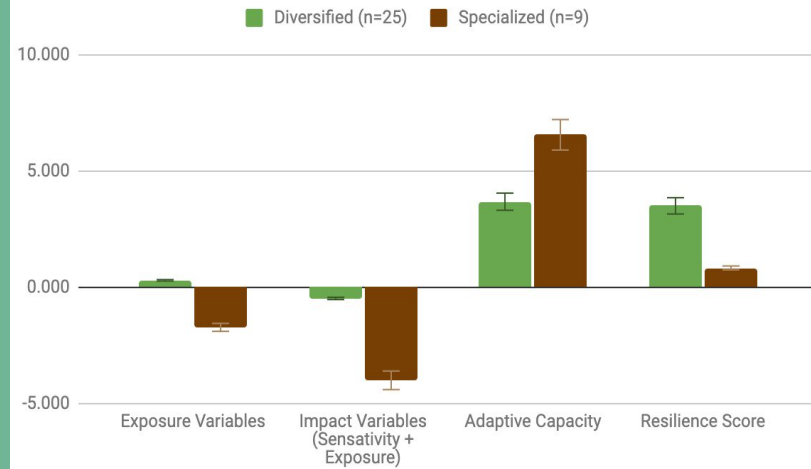
Hurricane Eta and Iota, 2020



# SELECTED RESULTS: Nicaragua



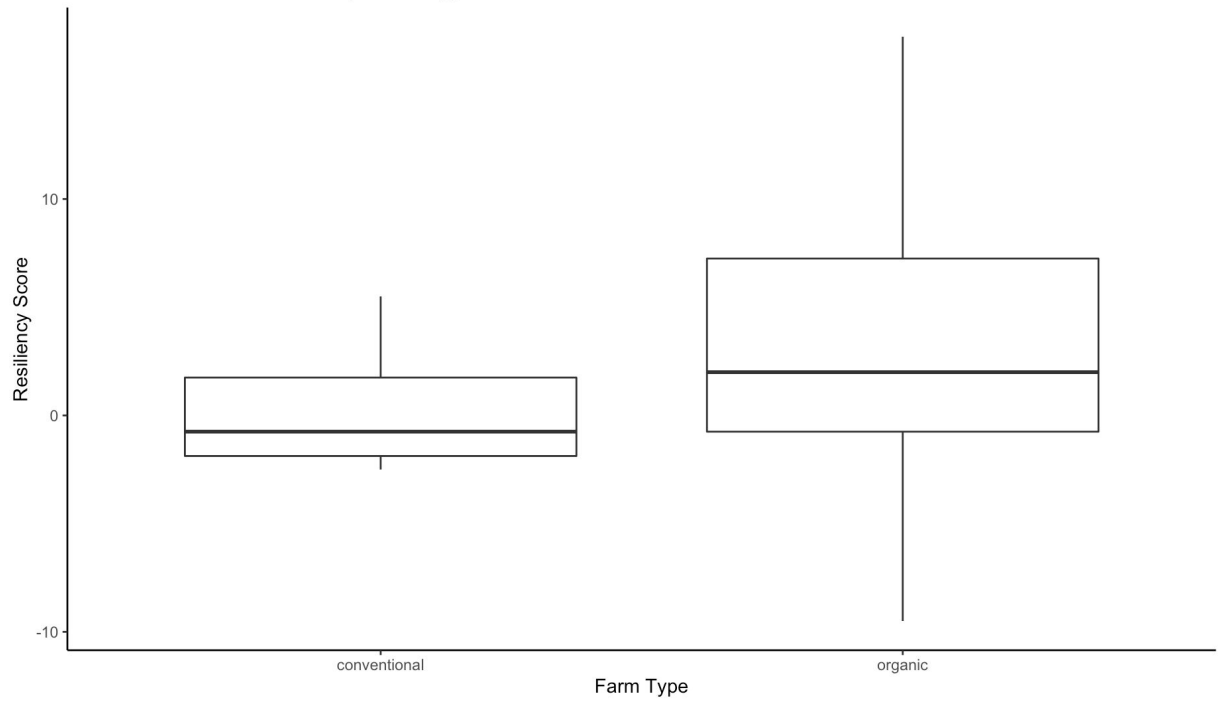
Climate Resilience - Diversified vs. Specialized Coffee Parcels, 2019



**On farm monitoring for Climate Resilience, Coffee Parcels**

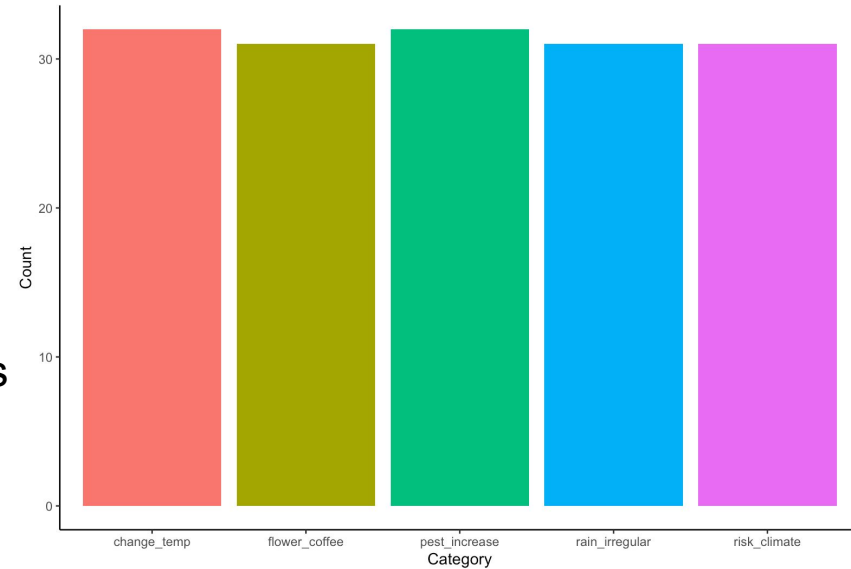
# On farm monitoring for climate resilience: continued

Climate resilience score by farm type (n=34)



# Recommendations for building climate resilience with coffee producers

1. Incorporate temperature resistant varieties (Adaptation & Mitigation)
2. Grow robusta coffee instead of arabica coffee (Adaptation & Mitigation)
3. Implement adaptation & diversification systems (Adaptation & Mitigation)
4. Implement agroforestry and reforestation systems (Adaptation & Mitigation)
5. Implement irrigation systems (Adaptation)



# Literature Review: Diversification & Gender Implications



Photo: PRODECOOP

- Benefits but also limitations for women (lack of access to resources, training, and control over land and/or income)
  - Resources and knowledge available affect ability to adapt to climate change and food security status
- Women are typically primary caregivers of children (face double or triple burden of having to work and provide)
- Often don't have access to diversification training which is key to improving their livelihoods

# Literature Review: continued

## Maternal resources and household food security: evidence from Nicaragua

Published online by Cambridge University Press: 07 January 2015

[Kammi K Schmeer](#), [Barbara A Piperata](#), [Andrés Herrera Rodríguez](#),  
[Virgilio Mariano Salazar Torres](#) and [Francisco José Centeno Cárdenas](#)

[Show author details](#) ▾

  
Research Article

***“I came all this way to receive training, am I really going to be taught by a woman?”*** Factors that support and hinder women’s participation in agroecology in Costa Rica

[Olivia Sylvester](#)   & [Mary Little](#)

Published online: 30 Aug 2020



# Gendered Analysis of Agricultural Training - Methods

Capacitaciones realizadas en el período 2013-2014



- Trainings and gender participation listed in PRODECOOP annual reports from 2011-2019 →
- Coded trainings
- Focus on Female/Male participation in **Gender related** and **Diversification related** trainings
- Chi-square test of independence for associations
- Chi-square Goodness of fit test for independent distribution

No.	Concepto	No. de eventos	Participantes		Usuarios(as)	
			Total	H		M
<b>1</b>	<b>Desarrollo de Capacidades productivas:</b>	<b>117</b>	<b>2958</b>	<b>2154</b>	<b>804</b>	
	Taller sobre instructivo para actualización de mapas, llenado de registros orgánicos y planes de manejo.	1	55	47	8	Inspectores internos promotores y
	Taller sobre instructivo para el llenado de fichas técnicas.	1	74	67	7	Inspectores internos promotores y
	Demostración práctica sobre establecimiento de viveros y manejo de plantaciones de café.	14	258	213	45	Socios (as)
	Intercambio de Experiencia sobre SSAN.	3	51	36	15	Socios (as)
	Asesorías y capacitación para implementar 160 sistemas agroalimentarios diversificados, (remolacha, cebolla, pepino, ayote y pipián).	8	160	88	72	Socios (as)
	Capacitación y asistencia Técnica para llenar 1118 Fichas de Cl.		1091	780	311	Socios (as)
	Asesoría para cultivo de granos básicos, diversificación productiva y huertos familiares (impartido por promotores, inspectores internos y personal técnico).	64	1200	876	324	Socios (as)
	Talleres en sanidad y nuevas técnicas de producción apícola.	8	51	36	15	Socios (as)
	Todo el personal se ha capacitado en Agroecología aplicable a café, seguridad alimentaria, cambio climático y género a diferentes niveles, en cursos, talleres e intercambios de experiencia locales, e internaciones.	18	18	11	7	Colaboradores (as)
<b>2</b>	<b>Desarrollo de capacidades de Género</b>	<b>135</b>	<b>4162</b>	<b>2710</b>	<b>1452</b>	
	Talleres de inducción al Proyecto de Desarrollo de Mujeres.	8	113	113	0	Socias
	Capacitación sobre proceso de certificación de género	3	35	35	0	Coordinadoras de Género

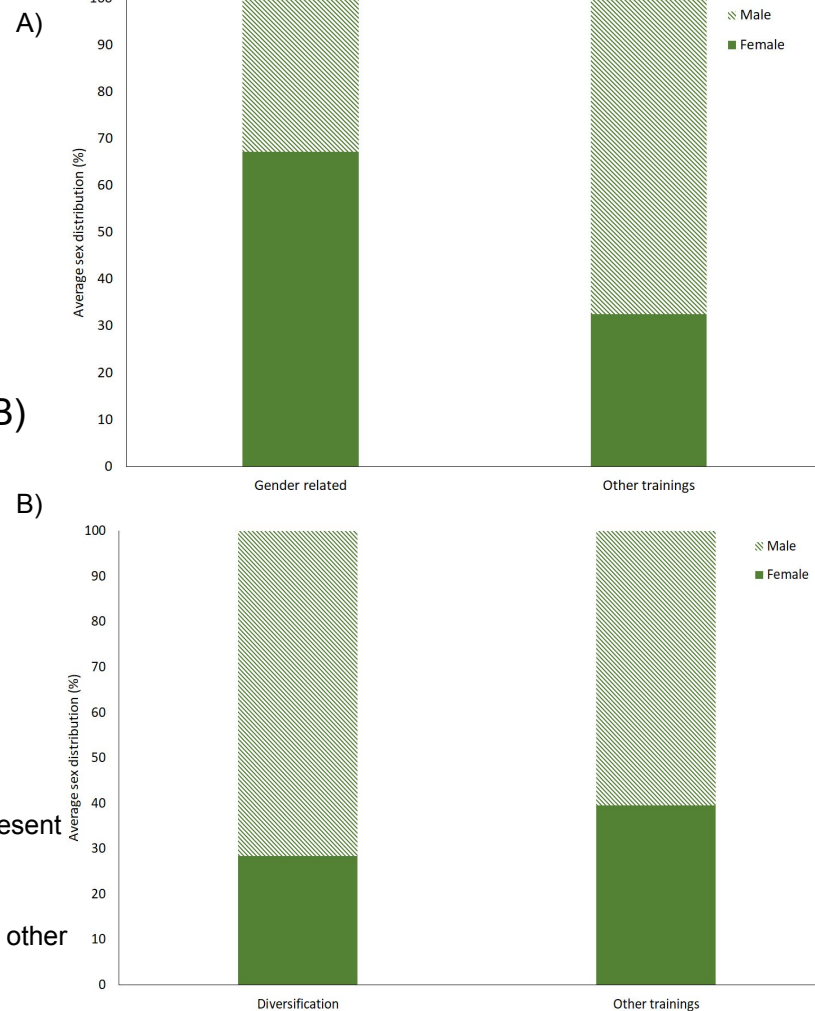
Source: PRODECOOP's annual report 2013-2014.

# Analysis of Agricultural Training By Sex of Participants

- Significantly **more** female attendance in **gender** related trainings compared to all other trainings (Figure 1A)
- Significantly **less** female attendance in **diversification** related trainings compared to all other trainings (Figure 1B)
- Goodness of fit chi-square test proved data to be from different distributions

**Figure 1A.** Average sex distribution of participants in gender related training vs all other extension and developmental co-op led training from 2011 to 2019. Dark green bars represent female attendance and stacked light green bars are male attendance.

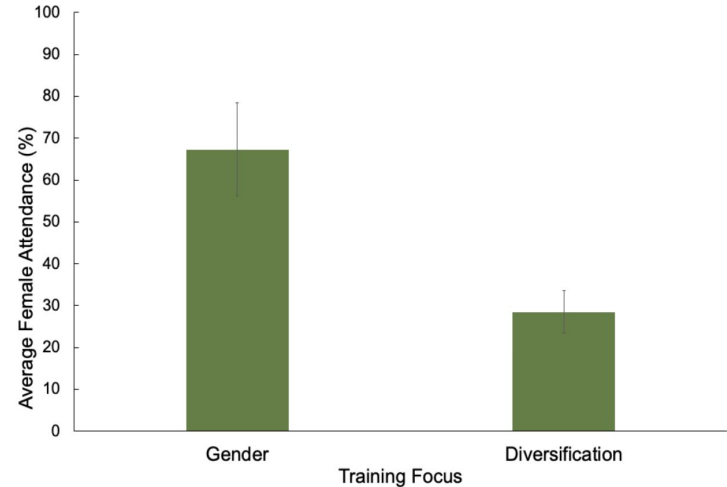
**Figure 2B.** Average sex distribution of participants in diversification related training vs all other extension and developmental co-op led training from 2011 to 2019.



Source: Our Analysis of PRODECOOP's annual reports.

# Analysis of Agricultural Training By Sex of Participants

- Females more likely attend trainings that are related to gender inclusion, advocacy, equality, etc.
- Females less likely to attend trainings related to learning about diversification of farming
- Results of female participation likely due to gender roles of community
- Potential limitation is gender considered/reported as binary

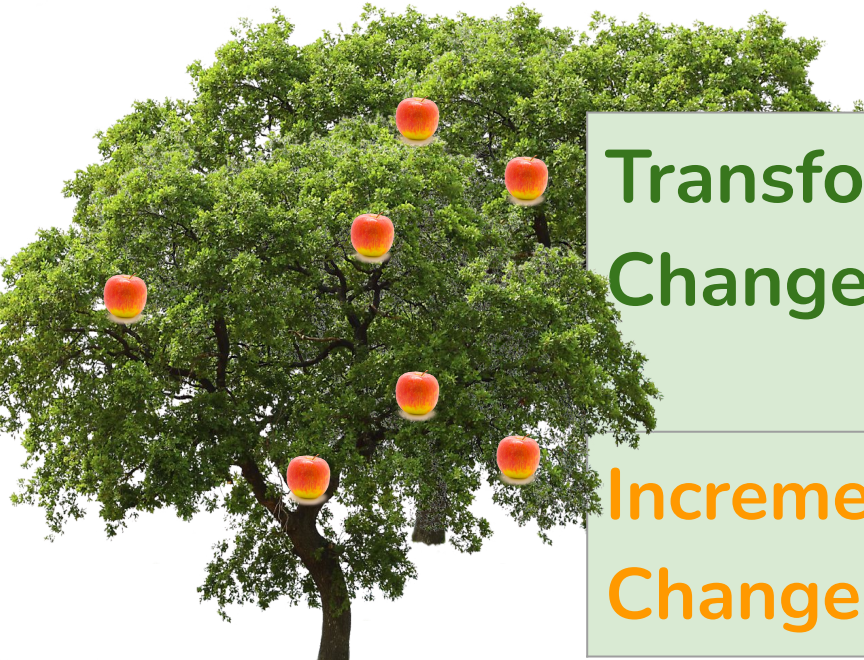


# Takeaways - on diversification's, food security, resilience & gender

✓ **Food security** remains a challenge, but we found a significant positive correlation between dietary diversity and farm diversity.

✓ **Gender relations** - co-op's gender program is awesome, but could improve with more females in trainings. Honey production could contribute to women's economic empowerment, risks of double burden.

✓ **Coffee plot climate resilience** - was higher in diverse shade parcels, but these farmers need more investment in organic production to build adaptive capacity.




## Transformational Changes

- PAR partnerships w/ co-ops using agroecology for diversification & food sovereignty
- Agronomists becoming agroecologists
- a fairer deal for smallholders
- changed gendered attitudes/practices

## Incremental Changes

- more climate adaptation finance to developing countries
- organic and fair trade coffee





**Cool! Now...**  
**What can you, I, we do?**



# No More Superficial Approaches to Resilience



*"[Stop calling me resilient, Boundary Way, Belfast, Northern Ireland.](#)" © Ilan Leonard*

# Looking for that Inner Resilience



## *Laudato si'*:

(1) gratitude for the beauty of nature as creation (§220); (2) rejection of the dominant “culture of consumerism, which prioritizes short-term gain and private interest” over the long-term interests of the poor and planet (§184); and (3) a conversion that reconciles individuals with themselves, others, and creation (§217–218).

<https://www.bread.org/report/2019-hunger-report>



ENCYCLICAL LETTER  
*LAUDATO SI'*  
OF THE HOLY FATHER  
FRANCIS  
ON CARE FOR OUR COMMON HOME

# Action 1: SCU Student Food Security Steps

## Incremental

1. Donate gift cards to SCU food insecurity program (also donate meal points)
2. Volunteer at local food banks
3. Donate to food justice organizations that support racial justice and aim to change the system
4. Provide food education and present resources during orientation sessions

## Transformational

1. Support the Advocacy with Workers on Campus movement
  - a. Let administration know you would like to see the contract with Bon Appetit broken
2. Advocating for increased financial aid for students and donating to scholarship funds
3. Advocate for year-long housing contracts

\*\*SCU Students! Contact [cgentilemontgomery@scu.edu](mailto:cgentilemontgomery@scu.edu) to get involved with food security at SCU

# Action 2: Be a conscious eater & consumer (emma+paige)

## Incremental

### 1. “Vote with your dollar”

- a. Organic, Regenerative
- b. Local
- c. Fair Trade
- d. Humane



### 2. Choose plant-forward or plant-based diets



## Transformational

1. Support agricultural orgs who are growing food justice and food sovereignty
2. Campaign & vote for political systems that support cruelty free, regenerative, and fair trade food production
  - a. Form Food Systems Working Group at SCU



\*\*SCU Students! Contact [emccurry@scu.edu](mailto:emccurry@scu.edu) to get involved with food procurement at SCU

# Action 3: Act collectively to change norms and policies

## Incremental

1. Advocate for more climate adaptation finance to developing countries.
2. Source more organic and fair trade foods at Santa Clara U, at home, and beyond.

## Transformational



1. Form PAR partnerships w/ co-ops using agroecology for diversification & food sovereignty
2. Learn about and practice transformational agroecology (not the reductionist version)
3. Start a co-op and/or join up an agroecology / food justice group (e.g., Valley Verde, La Mesa Verde, Community Agroecology Network)



# Thanks to so many, including:



SANTA CLARA UNIVERSITY  
**Environmental Justice  
and the Common Good**

National Science Foundation



**agropolis** fondation

Supporting agricultural research  
for sustainable development



**fondazione  
cariplo**



**fundación  
daniel & nina  
carasso**



# Potential Slides for Q&A

# Session overview

Time	Session	In-charge
5 mins	Welcome remarks	Prof. Kristin
10 mins	Introduction and A Global Overview of Agroecology and Food Systems Change	Prof. Chris Bacon
15 mins	Student Food Security at SCU	Chloe Gentile-Montgomery, Benjamin Grundy, Julia Jenak
15 mins	SCU Campus Food System: Real Food Challenge & Climate Emissions Analysis	Emma McCurry, Paige Whittaker
15 mins	Diversification strategies in coffee systems in Nicaragua	Prof. Chris Bacon, Erica Martinez, Skyler Kriese, Gabi Ballard,
5 mins	Conclusion	Prof. Chris Bacon
10 mins	Discussion	All of us

# Nitrogen vs Carbon Emissions

- Nitrogen footprint  $\neq$  Carbon footprint
- Nitrogen footprint: “Reactive nitrogen”
  - **nitrous oxide ( $\text{N}_2\text{O}$ )**, nitrogen oxides ( $\text{NO}_x$ ), nitrate ( $\text{NO}_3^-$ ), nitrite ( $\text{NO}_2^-$ ), and ammonia ( $\text{NH}_4$ )
- Consequences: water eutrophication, ocean acidification, and biodiversity loss
- Agriculture is *overwhelming* the largest contributor

