

## ABSTRACT

Colleges and universities have the opportunity to advance their commitments to equity, ethics, and sustainability by changing their food procurement strategies. Various institution-oriented food system change efforts have emerged, encouraging colleges and universities to address the social, health, and/or environmental impacts of the food they procure. Many of these approaches have been gaining traction individually, but literature assessing multicriteria food system change efforts is rare. Here, we use agroecology to develop a framework for assessing campus food system change and conduct a case study at Santa Clara University (SCU). SCU has pledged to reduce greenhouse gas emissions and to advance environmental justice through campus food purchases. To track progress and identify areas for improvement, researchers at SCU collaborated with the Real Food Challenge (RFC) and the Sustainability Indicator Management & Analysis Platform (SIMAP). In addition to comparing the impacts and costs of several strategies for changing institutional food systems, we suggest strategies for integrating environmental and social justice evaluation tools. We contribute a perspective on the usefulness and implementation of RFC and SIMAP, insights from combining these tools in analysis, and recommendations for their future improvement. We conclude with a critical assessment of food systems change metrics.

## INTRODUCTION

Prior to the outbreak of COVID-19, the US saw a steady increase in food eaten away from home. Much of this food is from fast and full service restaurants, but institutions (schools, universities, hospitals, churches, and government agencies) continue to purchase, prepare and serve a significant portion of this food. At the same time, growing concerns about climate emissions associated with food and agriculture and a persistent demand for a more just and sustainable food system have encouraged various proposals positioning institutions as conscious food consumers. In this study, we draw on agroecology and farm-to-institution literature to develop a framework for assessing campus-based food system change and conduct a case study. Santa Clara University (SCU) has pledged to reduce campus greenhouse gas emissions and advance sustainability and environmental justice through campus food purchases. To track progress and identify areas for improvement, researchers at SCU collaborated with the Real Food Challenge (RFC) and the Sustainability Indicator Management & Analysis Platform (SIMAP). In addition to comparing the projected climate emissions and cost effectiveness of various strategies for changing food purchasing, we suggest strategies for integrating environmental and social justice-related evaluation tools together in institutional food systems.

## METHODS

### Case Study Design

Two student fellows analyzed over 11,000 line items of purchasing records from October 2018 and February 2019. Purchasing records included Accounts Payable records of invoice totals, electronic spreadsheets of itemized invoices, and physical invoice records for each month. For a food product to qualify as "Real" in the Real Food Challenge, it must meet at least 1 of 4 criteria: fair, local, humane or ecologically sound. Items were evaluated using the Real Food Guide 2.1 Standards<sup>4</sup>. Researchers recorded weight and up to three main ingredients for each line item for the purpose of calculating a greenhouse gas emissions profile using SIMAP Food Report calculator and analysis<sup>2</sup>. The calculator uses average carbon and nitrogen emissions data for production, transportation, and waste of individual food groups to estimate total emissions for an institution

### Product Shift Scenario Calculations

"Product shift scenario" is a theoretical change in SCU's food purchasing habits intended to create a more just and sustainable campus food system. For each scenario, we calculated the respective increase in Real Food percentage for SCU, an estimated change in cost, and associated shift in SIMAP greenhouse gas emissions calculation. Each scenario is a retrospective computation of theoretical findings from the 2018-19 Real Food Challenge and SIMAP research. Detailed calculations for each scenario are available in the supplementary methods document upon request.

1. *Switch all milk to current Real-qualifying local vendor*
2. *Implement "Meatless Monday":* We assume that 14% (roughly 1/7th) of meat and fish is replaced with Real-qualifying plant-based protein on a gram-per-gram of protein basis.
3. *Utilize Menus of Change's "Protein Flip":* Meat is served as a side dish when offered. We estimate this as 50% reduction in meat and fish purchases, replaced and corresponding increase in plant-based protein purchases as described above.
4. *Completely vegetarian dining halls:* 100% of meat and fish is replaced with Real-qualifying plant-based protein.
5. *Source all produce from small & medium-sized local farms:* Located within 250 miles of California's Central Valley, SCU has a unique opportunity to procure virtually all of our produce from local vendors. We utilize the Real Food Challenge's criteria for local products.
6. *Become a Fair Trade University:* We imagine SCU becomes a Fair Trade University by procuring 100% Fair coffee beans and chocolate products

## FINDINGS

### Real Food Analysis

- Total Real Food Percentage = 21.68% ( $\pm$  2.35% margin of error)
- Largest Real Food Expenditures at SCU were produce, fish, poultry, dairy, and beverages
- Meetings facilitated by this research provided an opportunity to meet with food system administrators and university actors, building trust within the system and lending traction to the goal of food system sustainability

### Climate Emission Analysis

- Carbon emissions for the 2018-19 academic year were 4,677.14 metric tons.
- Nitrogen emissions were 63.5 metric tons.
- 81.33% of carbon emissions and 88.72% of nitrogen emissions from SCU's food system are due to consumption of animal-based products.

## FINDINGS

### Real Food Percent of Total Cost

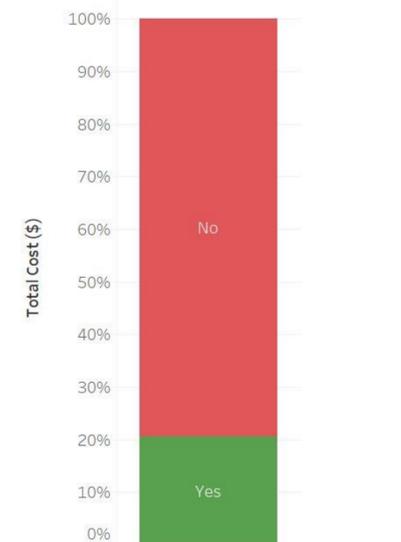
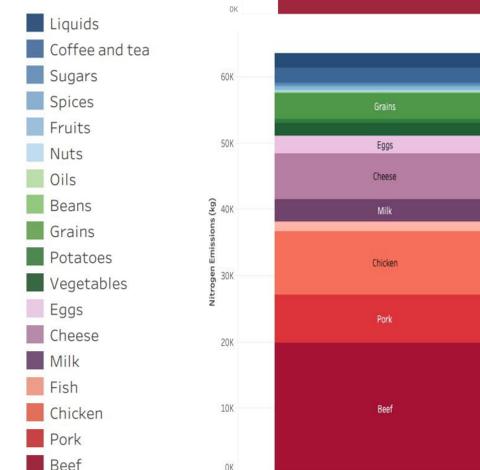


Figure 1 shows the total expenditure on Real Food averaged across October 2018 and February 2019

### Carbon and Nitrogen Emissions Profiles

Figure 2 shows the carbon (top) and nitrogen (bottom) emissions profiles for October 2018 and November 2019. Emissions calculated with SIMAP's Food Report calculator.



### Product Shift Scenarios

- Shifting institutional purchasing of animal-based proteins towards Real-food qualifying plant-based proteins emerged as a financially feasible way to increase consumption of ethically sourced products while decreasing climate impact.

Table 1 shows the impact of proposed product shifts on emissions and real food procurement.

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
Current (Reference Case)	--	--	--	--
1. Switch all milk to current Real-qualifying local vendor	+1.38%	negligible	negligible	+0.16%
2. Implement "Meatless Monday" (Replace 14% of animal protein)	+1.42%	-4.83%	-5.72%	-1.10%
3. Utilize "Protein Flip" (Replace 50% of animal protein)	+5.26%	-20.81%	-25.30%	-3.87%
4. Vegetarian dining halls (Replace 100% of animal protein)	+10.97%	-37.96%	-44.89%	-7.73%
5. Source all produce from small & medium-sized local farms	+9.31%	negligible	negligible	+2.94%
6. Become a Fair Trade University through fair coffee and chocolate	+2.43%	negligible	negligible	+0.61%

## CONCLUSION

### Recommendations for increasing RF procurement at SCU:

- Choose local and organic bakery items, switch to fair-trade coffee, sugar, and tea, source from humane dairies, Promote purchasing of plant-based food
- 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.

### Insights from combining Real Food Challenge and SIMAP

#### PROS

- Captures social and environmental metrics
- Enables exploration of potential product shifts
- Speculation about how those shifts will impact procurement cost, overall food system expenditure, and sustainability
- Begins to illustrate performance using globally-established variables (that is, using the same measures as the UN SDGs and the WBCSD)

#### CONS

- Integrating social and environmental metrics can be cumbersome depending on the institution's size
- SIMAP doesn't account for some farm variables
- Inherent assumptions in both tools

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

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