

# Berkeley Food Institute Research Summaries

INTERDISCIPLINARY RESEARCH PROJECTS 2013–2017



# About the Berkeley Food Institute

The Berkeley Food Institute seeks to transform food systems to expand access to healthy, affordable food and promote sustainable and equitable food production. We empower new leaders with capacities to cultivate diverse, just, resilient, and healthy food systems. To create change, we lead programs in education, policy, communications, and interdisciplinary research.

## Our Research Program

BFI's research program funds critical, cross-functional projects at UC Berkeley. During 2013–2016, BFI provided more than \$336,000 in funding through 13 faculty research seed grants comprised of 57 principal investigators and 49 collaborators.

From 2013-2016, BFI focused on funding smaller seed grants to support innovative ideas across a range of issues. As we evolve as an organization, we are increasing our funding for a more targeted number of projects to maximize our impact in our core focus areas.



# Berkeley Food Institute Funded Research

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HOME AND HARVEST

**Improving Food Security among Youth in Permanent Supportive Housing**

Food insecurity is a critical issue among minors and young adults who experience homelessness and unstable housing. In the 2013 San Francisco Point-in-Time count, 61% of unaccompanied minors and homeless young adults ages 18–24 reported food as their greatest need.<sup>1</sup> Even for youth who manage to obtain permanent supportive housing, many continue to face barriers to obtaining healthy and adequate nutrition. In our prior work, we found that among youth living in San Francisco’s first city-funded permanent supportive housing building specifically designated for transitional-age youth (ages 18–24), 71% of residents scored at a level of severe food insecurity on the Household Food Insecurity Access Scale,<sup>2</sup> and an additional 16% were moderately food insecure.

This study was launched in order to better understand the barriers to obtaining adequate nutrition among youth with a history of homelessness/unstable housing who are now living in permanent supportive housing. We chose a participatory, arts-based methodological approach using the project platform PhotoVoice to enable the youth participants to take ownership of the research process. In doing so, participants explored issues of food insecurity in their lives in a creative, engaging manner.

**Objectives**

1. Assess and document barriers to obtaining adequate, healthy foods faced by youth living in permanent supportive housing.
2. Inform programs and practices around food security for housing providers working with youth who have experienced homelessness.



“An EBT card inside a Carl’s Junior sandwich.” Photo by Jade.

3. Increase public awareness and engage community members, businesses, and policymakers in discussions about the experiences of hunger among homeless, unstably housed, and other marginalized youth.
4. Inform potential philanthropic or policy solutions to food insecurity among vulnerable youth populations.

**The Research**

The Young Adult PhotoVoice Project (YAPP) is a community-based participatory research study designed to assess, document, and disseminate an understanding of the barriers to obtaining adequate healthy food faced by formerly homeless youth. The project utilizes PhotoVoice, a research methodology that combines photography and group discussion to amplify the voices and visions of marginalized communities.

Nine young adult residents (ages 18–24) participated in the study. The project consisted of eleven 2.5-hour long sessions over a period of four months. Study participants were given digital cameras and received training in photography as well as in the safety and ethics of taking pictures. Each week participants chose a prompt to guide their photo-taking, and participated in critical reflection and dialogue around their photos. Participants subsequently created captions and wrote narratives for their photographs. All group discussions were audio recorded and transcribed verbatim, and were coded using thematic analysis. The project culminated in a final photography exhibit in downtown San Francisco.

*“I wish my food stamps didn’t get cut off. I don’t know why they got cut off. So I had to go to the food bank and get all of this crap. I spent all of my money on my dog’s food.” – Nick, YAPP participant*

**Findings**

Group discussions of photographs revealed several important barriers to food security. These included:

- Inadequate funding through government assistance programs to cover monthly food expenses
- Lack of accessible, affordable healthy food outlets near the supportive housing facility
- The importance of pets as emotional support and the willingness to prioritize limited funding on food for pets over food for the self
- Challenges associated with communal living, such as the lack of hygiene in a communal kitchen
- The stigma associated with seeking free meals at homeless shelters and soup kitchens
- Restrictions imposed by restaurants and grocery stores on giving away unused food
- The lack of fresh, healthy foods included in the food boxes given out by non-profits
- Health issues that impede some participants from being able to leave the building on a regular basis to seek out food



“Your Trash, My Treasure.” Photo by Josh.

**Implications**

Findings highlight the challenges related to food security of youth entering into permanent supportive housing. The work of youth photographers presented through the final photo exhibition helped to increase awareness among community members, businesses, and policymakers in San Francisco of the issue of food insecurity.

**Research Team**

*Youth photographers:* Amber, Apple, Jade, Jessica, Jessica, Josh, Justin, Mercedes, and Nick

*UC Berkeley:* Collete (Coco) Auerswald and Emily Ozer (Principal Investigators; Public Health), Corey Drew, Kelly Johnson, Jessica Lin (Public Health)

*External Collaborators:* Sarah Dobbins (photography mentor; San Francisco Department of Public Health)

**References**

1. *Homeless Point-in-Time Count and Survey: Comprehensive Report.* Applied Survey Research (ASR). 2013.
2. *Household Food Insecurity Access Scale (HFIAS) for Measurement of Household Food Access: Indicator Guide (v. 3).* USAID. Washington, D.C.: Food and Nutrition Technical Assistance Project, Academy for Educational Development, August 2007.

## The Berkeley Sugar-Sweetened Beverage Tax A Transdisciplinary Approach to Evaluating the Impact

Frequent consumption of sugar-sweetened beverages (SSBs)—especially by children—is contributing to high rates of tooth decay, obesity, cardiovascular disease, and diabetes. In an effort to reduce these health threats, Berkeley became the first municipality to pass an excise tax on SSBs in November of 2014. While most of the public dialogue on SSBs has focused on the obesity-related concerns, the oral health concerns warrant additional attention. Through an interdisciplinary collaboration among public health, nutrition, dental, and media experts, along with community groups, this project assesses the impact of Berkeley’s SSB tax by adding evaluation of oral health themes through analysis of media messages, focus groups and interviews with parents, and tracking oral health outcomes through existing child dental screening data.

### Objectives and Methods

#### 1. Evaluate the public debate about SSB excise taxes, including the role of oral health, through the window of news coverage

The team collected data from local and national media—television, newspapers, e-news, radio, home mailers, and social media—to assess how the SSB tax debates unfolded during the campaign and immediately following the Berkeley vote. The team coded and analyzed how, by whom, and in what context oral health arguments were used relative to arguments surrounding obesity, diabetes, and other SSB-related health outcomes.

#### 2. Determine the saliency of oral health, relative to other health outcomes, among Berkeley voters

In collaboration with Berkeley Head Start and Berkeley Unified School District, the team conducted focus groups



Photo by Chen Gong, *Daily Californian*.

with Berkeley voters who have children under twelve years old around issues of oral health, other SSB-related health outcomes, and the SSB tax campaign. Additionally, the research team conducted in-depth interviews with 20 Berkeley parent voters, in both English and Spanish, to explore what they felt, knew, and practiced when it comes to giving their children SSBs.

#### 3. Determine the impact of Berkeley’s SSB tax on changes in oral health among Berkeley children

In collaboration with UCSF School of Dentistry, the team developed partnerships with the City of Berkeley’s Oral Health Program and Alameda County’s Office of Dental Health to begin assembling a dataset of Berkeley children’s oral health outcomes pre- and post-tax.

### Findings

#### 1. Dental professionals can be better engaged in SSB tax efforts

Dental professionals were not significantly involved in the media efforts around the SSB tax, and oral health/tooth decay was mentioned in only 2% of the communications. This study identified a missed opportunity that could be seized in future SSB tax efforts—to increase both the

involvement of dental professionals and the focus on reducing SSB consumption to decrease tooth decay rates in children and adults.

#### 2. Parents want to reduce sugar consumption, but additional education and outreach is needed

Parents were interested in reducing their families’ sugar consumption, but held misperceptions regarding the sugar content of different beverages, and experienced social pressures to consume SSBs at family and community events. Parents who succeeded in reducing SSB consumption often cited education or personal experiences with diseases such as obesity, diabetes, and tooth decay as motivation for behavior change. Parents found visual messages regarding oral health to be very impactful.

#### 3. Parents seek greater transparency over how the tax funds are being used

Although most parents supported Measure D, and some reported decreasing SSB consumption as a result of the tax, many expressed confusion and concern over how funds were being used.



An example of marketing materials created by Contra Costa County to communicate the connection between consumption of SSBs and children’s oral health.

### Conclusions

Berkeley’s passage of the SSB tax in November 2014 provided an unprecedented opportunity to evaluate the

impact of these campaigns and taxes. This study is the first to document parents’ reactions to a local SSB tax and their responsiveness to health messages, particularly regarding oral health. The study identified an opportunity to increase advocacy by dental professionals and expand public health messages to oral health, which may increase the effectiveness of advocacy and messaging beyond those limited to obesity and diabetes.

In addition, the study identified a need to further educate parents about the sugar content of SSBs and how funds from Measure D are spent, and to develop strategies to support parents in reducing SSB consumption, particularly at social events.

### Next Steps

The research team is disseminating the study results through multiple avenues including presentations, websites, and professional publications. This study’s interdisciplinary partnerships—across the university, public health, nutrition, dentistry, media experts, public health agencies, and community groups—may be extended for further interventions and studies focused on obesity and oral health. Berkeley’s SSB tax may stimulate changes at multiple levels: in food environments via higher prices, message environments via media, culture by changing social norms, and individual behavior and health.

Lessons learned from this study can provide important information for other cities promoting SSB taxes (including San Francisco, Oakland, and Albany where SSB taxes were passed in November 2016), and other municipalities that are planning SSB tax initiatives.

In all, Berkeley’s SSB tax serves as a landmark case study of a local economic approach to changing food systems, which may inform future local and grassroots efforts to improve the food and agricultural environment.

### Research Team

Karen Sokal-Gutierrez, Kristine Madsen, Jennifer Falbe, Patricia Crawford (Public Health), Pamela Mejia (Berkeley Media Studies Group), Lori Dorfman (Public Health and Berkeley Media Studies Group)

## Fostering Food Security, Biocultural Diversity, and Health Mapping Agro-biodiversity Hotspots and Cultural Foods in the Urban Food Desert

The purpose of this project is two-fold: 1) to increase the visibility and opportunity for scaling up the production and exchange of culturally important food plants to help foster healthful food traditions and combat food insecurity in urban food deserts, and 2) to test the hypothesis that urban areas with high cultural diversity may also have high concentrations of agro-biodiversity in their gardens. The researchers surveyed the diversity of cultural food plants that are being grown in East Bay community gardens and created an interactive, participatory visual tool (GIS map) for communities to promote seed and plant sharing.

### Objectives

1. Gather ethnographic and botanical information about East Bay urban agro-biodiversity and cultivated cultural food plants.
2. Develop an interactive GIS map of East Bay community gardens and urban production farms in collaboration with community-based non-profits, documenting agro-biodiversity with socio-economic, demographic, and food desert overlays.
3. Create an East Bay Cultural Food Exchange to increase visibility of and promote the exchange and cultivation of cultural foods.

### Methods

**1. Planning:** UC Berkeley students (13 undergraduate and 2 graduate) were trained in ethnobotanical research and plant collection methods. A total of 106 gardens (school, community, for-profit, and non-profit farms) in the East Bay were identified and added to a GIS database/map.

**2. Participatory Research:** The team took photos and



A Kenyan gardener grows cultural plants high in protein and medicinal qualities. Photo by Jennifer Sowerwine.

conducted ethnobotanical interviews with 46 gardeners from 18 different ethnic backgrounds at 12 community gardens. Information was gathered on over 800 plants and plant samples were collected to determine biodiversity patterns and hotspots.

**3. Extension:** The team hosted four seed and plant exchanges to engage the East Bay community, and informed refugees and immigrants about gardening opportunities.

### Findings

#### High Agro-biodiversity in the East Bay

The team identified 310 species (not including varieties) of plants representing 71 plant families in just 10.5 acres. Eight plant families make up more than half of all plant species identified, yet more than 60 families contribute 48% of all species, indicating very high botanical diversity. In contrast, the world's food supply depends on about 150 plant species. Of those 150, just 12 provide three-quarters of the world's food.

### Community Gardens are Vital for Food Security and Cultural and Mental Health

Access to food was the primary reason people gardened (33%), followed by enjoyment (22%), mental health (15%), physical health, spending time with friends, and lastly, being outside (4%). 18% said "other," which included spiritual reasons, ability to share food, learn new things, access organic food, and make art. Immigrant gardeners maintain strong cultural ties to their food plant heritage: "These are important ingredients in my cuisine, they remind me of my home and mother." Many shared their cultural foods with family and friends outside of the Bay Area. All indicated a desire for more land, and four indicated that loss of the garden would pose great hardship.

### Relationship between Agro-biodiversity and Cultural Diversity

Immigrants cultivate many unique varieties, species, and plant families for food, medicinal, and spiritual reasons in the East Bay. Inter-cultural exchange is a vibrant part of diverse community gardens in which gardeners share seeds, starts, recipes, and knowledge. Though many common plant families such as cucumber, pepper, leafy greens, and mints are considered "global" species, immigrant groups often cultivate unique varieties.



Photo by Jennifer Sowerwine.



"Global" species. Photo by Jennifer Sowerwine.

### Conclusion: Risks and Opportunities for Urban Agro-biodiversity

East Bay urban gardens are important repositories of agro-biodiversity, and represent sites of rich cultural knowledge sharing of culturally important food plants for food security as well as mental, physical, social, and cultural health. Like other vulnerable ecosystems, urban gardens must be considered as part of the larger agro-ecosystem and measures must be taken to conserve and protect them. Tenuous land rights, development pressures, and shifting priorities threaten the viability of urban agro-ecosystems. Future research will include expanding the number of gardens and further developing and promoting the interactive garden map.

### Research Team

Jennifer Sowerwine and Maggi Kelly (Environmental Science, Policy, and Management; UC Cooperative Extension), Thomas Carlson (Integrative Biology), Rob Bennaton (UC Cooperative Extension)

Acknowledgements:

*Special thanks to community partners and gardeners for facilitating access to their gardens and sharing information.*

# Building an Evidence Base for State and Federal Policy on the Supplemental Nutrition Assistance Program (SNAP)

The Supplemental Nutrition Assistance Program (SNAP), known as CalFresh in California, plays a valuable role in lifting low-income households out of poverty and mitigating food insecurity. Providing billions of dollars in nutrition assistance benefits to nearly 48 million children, adults, and seniors, SNAP has great potential to support health and healthful eating. Policymakers are currently considering proposals to restrict the purchase of certain foods and beverages with SNAP benefits. Any such changes require rigorous testing to assess the effects on SNAP participants and the program at large.

## Objectives

The research team set out to convene a Scientific Advisory Board that would draw on expertise in economics, public health, nutrition, law, public policy, poverty, and behavioral sciences to inform the design of a CalFresh restriction-incentive demonstration project. While pursuit of the demonstration project was ultimately deemed unfeasible, the team successfully congregated a Scientific Advisory Board to produce two policy briefs that communicate SNAP's existing strengths and challenges, as well as opportunities to encourage participants to make healthier choices.

## Scientific Advisory Board

The research team held two meetings for a Scientific Advisory Board, comprised of Berkeley faculty, California Food Policy Advocates members, Berkeley Food Institute leadership, students, and postdoctoral fellows. The group drafted a policy brief and companion study design and evaluation document to assist the California Food Policy Advocates in creating a SNAP demonstration project to test the effects of purchase incentives paired with



Source: USDA

restrictions.

However, in May of 2015, it became clear that the level of detail focusing on incentives and restrictions was not politically feasible. Due to a lack of interest at the state level, the California Food Policy Advocates withdrew their involvement in the demonstration project in July of 2015. Several other barriers have prevented the further pursuance of the demonstration project.

The research team pivoted to look at SNAP incentives to address food poverty, through a model of community engagement that aims to assess perceptions of food insecurity, identify resources related to food, and identify and prioritize solutions to address food insecurity.

These goals intertwine the exploration of barriers to participating in SNAP and the identification of potential strategies to increase SNAP enrollment. This research has culminated in the production of two policy briefs that focus on improving diet quality using SNAP. Highlights from these briefs are found on the subsequent page.

## Policy Recommendations

Two companion policy briefs titled “The Future of SNAP” and “SNAP Can Support Health” summarize challenges and opportunities to increase participation and improve nutrition for SNAP recipients.

### Key Challenges

#### 1. Participation is incomplete

The number of eligible individuals who receive SNAP in California is one of the lowest in the country at 57 %.

#### 2. Nutrition remains inadequate

SNAP participants tend to eat less fruits and vegetables and are more likely to become obese than non-SNAP participants.

#### 3. Coping mechanisms lead to adverse health effects

Monthly fluctuations in food insecurity can lead to coping strategies such as hoarding, fasting, and bingeing, all of which can be severely harmful.

#### 4. Political opposition to SNAP is increasing

As SNAP participation has risen, political hostility has grown: the 2014 Farm Bill authorized \$8.6 billion in cuts to SNAP over the next ten years.

In light of these challenges, efforts to improve SNAP should focus on the program's strengths. SNAP can be better tailored to help low-income Americans achieve a nutritious diet in the following ways:

### Increasing Participation

#### 1. Connect enrollment with other state and federal programs

Pursue dual enrollment strategies for programs such as CalFresh and Medi-Cal (California's Medicaid program), which could streamline the application process for 12 million people.

#### 2. Make the application process more accessible and user-friendly

Set up regular enrollment clinics in local communities, and provide pre-screening and assistance to applicants through call centers.

#### 3. Reduce benefits formula in the eligibility criteria

Reduce the expected family contribution from 30% to 13–17%—an amount that reflects more typical food spending.

### Improving Nutrition

#### 1. Increase funding for nutrition education (SNAP-Ed)

The current budget of the SNAP-Ed program is half a percent of the overall SNAP budget and reaches only a small fraction of the eligible population.

#### 2. Improve food offerings at allowed retail outlets

Improve in-store marketing for healthy foods by providing guidance for healthy-product placement.

#### 3. Prioritize incentives/restrictions

Incentivizing consumption of fruits and vegetables and restricting sugar-sweetened beverages may reduce the risk of diabetes and obesity. More research is needed.

## Conclusions and Implications

The research makes policy recommendations to ensure nutritional health and economic welfare nationwide with SNAP. Together, leading researchers from UC Berkeley and other universities as well as representatives from respected non-profit organizations and government agencies have provided a launching point for future research in creating a more equitable food system.

## Research Team

Barbara Laraia (Public Health), Pat Crawford (Nutrition Policy Institute; UC Cooperative Extension), Maria Echaveste (Latin American Studies), Hillary Hoynes (Goldman School of Public Policy)

*External Collaborators:* California Food Policy Advocates

## Reaping Without Sowing

# Urban Foraging, Sustainability, Nutrition, and Social Welfare

### Objective

This project tested the hypothesis that in some urban “food deserts” there is in fact an abundant, sustainable source of fresh, free, and nutritious vegetables—namely, wild foods. By supplying accessible nutritious food, foraging for wild foods could provide a supplementary food source within the urban and peri-urban landscape as a means to help address inequities in access to nutritious foods.

The spatial sampling estimated the size of the resource, and thereby estimated the impact that more complete, but sustainable use of the wild foods would have on nutrition in three East Bay neighborhoods. This study has formed the basis for future work to improve nutrition in so-called “food deserts” by investigating barriers to wider utilization of urban foraging and educating residents about the bounty beneath their feet.

### Methods and Findings

#### Mapping Abundance

The research team mapped the abundance of wild and feral foods in three urban food deserts in Richmond, Berkeley, and Oakland using iNaturalist—an online platform where people can record images and details of plants seen in daily life—to capture a total of 623 observations. Over 100 edible wild or feral species were documented in the East Bay area, ranging from wild onions to mallow to various fruit trees.



Western Lettuce (*Lactuca ludoviciana*)  
Last seen on May 12, 2015 in 1681  
16th St., Oakland, CA, US (View all)

Example of an iNaturalist submission



Foraged weeds. Photo by Kristen Rasmussen.

#### Testing Soil & Nutrition

The team tested soils in the Richmond and Oakland food deserts for metals, and tested tissue from plants growing in the most challenged soil. It was found that in these areas, for the species in question, the level of metals in the plants is safe to eat after the plants are washed. The team estimates that, from the plots with the highest levels of lead and other metals, one could eat a kilogram of dried weeds daily without reaching harmful levels.

Early nutritional tests showed that foraged dandelion has twice as much calcium and fiber and 2.5 times as much iron as store-bought dandelion. Foraged mallow has more calcium than milk and 8 times as much iron as spinach, by volume.

#### Social Viability

The team conducted surveys of consumer knowledge and acceptance of wild/feral foods in farmers’ markets in the East Bay. UC Berkeley students surveyed 240 individuals at 5 farmers’ markets to investigate the cultural barrier to consumption. Social viability is important to investigate because the multi-faceted benefits of wild foods cannot be realized so long as these foods are not consumed.

### Outcomes

#### Berkeley Open Source Food

The team formed Berkeley Open Source Food (BOSF) and an advisory board that includes food journalist Mark Bittman, UC Berkeley Ethnic Studies lecturer AshEL Eldridge, food writer Daphne Miller (chair), and chef Alice Waters. BOSF provides a public platform to document research activities, findings, test results, outreach, and press coverage through its website: [forage.berkeley.edu](http://forage.berkeley.edu).

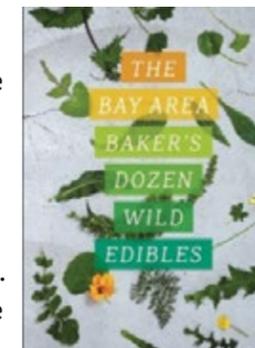


#### Wild & Feral Food Week

As part of this project, the team orchestrated “Wild & Feral Food Week” to raise awareness of wild and feral foods and demonstrate that they are “culinary, gastronomic ingredients” rather than “survival fare” by having weed-centric meals at thought-leading restaurants in the Bay Area, including Chez Panisse, Cesar, Mission Heirloom, and The Perennial. Over 20 restaurants participated in the 3rd annual event in 2017.

#### Field Guide

BOSF published a brief field guide to thirteen of the most common, delicious wild and feral greens in the Bay Area, involving 23 undergraduate students and four graduate students in the research. The Field Guide is available on the BOSF website.



### Vision for an Edible Campus

BOSF wrote a vision statement for an edible campus at UC Berkeley, emphasizing reducing water and carbon footprints and increasing sustainability and food security, signed by nearly 50 key faculty and staff at UC Berkeley.

“UC Berkeley can save water, reduce the exposure of staff, students, and faculty to toxic chemicals, reduce environmental contamination, and improve nutrition and food security by allowing foraging of edible, non-native, invasive species on campus and educating the campus community. We can think of the Berkeley campus as an ecosystem, rather than a landscape.”

– Vision for an Edible Campus

### Research Team

Philip B. Stark (Statistics), Tom Carlson (Integrative Biology), Kristen Rasmussen (Nutritional Sciences and Toxicology)

## The Millet Project

# Exploring Millets to Diversify Cereal Options in our Diet and the Environment

Millet is a drought-tolerant, gluten-free grain with a diverse nutrient profile. Despite this, it is not commonly grown or consumed in the United States, where corn, wheat, and rice dominate cereal grain production. “The Millet Project” (TMP) was initiated at the height of California’s drought in 2015. The goal of the project is to investigate how different millet varieties grow in various microclimates in California and the effect of drought and semi-drought conditions on their yield. TMP participants also strive to convey the benefits of millet to farmers and consumers in order to diversify the human diet, and consequently, agriculture.

### Objectives

1. Test cultivation on a small-scale of several millet varieties at different locations in California.
2. Build collaborative relationships with regional farmers and provide them with the best information about growing millets in their locations. This includes conducting a cost-benefit analysis of growing millets to measure its profitability per acre, allowing farmers to compare millet production against other crops.
3. Introduce millets to consumers and educate them about the many benefits of the grain through local millet exhibits and outreach events. Connect food producers with farmers and customers, encouraging them to use millet.

### So, what are millets?

*Millets are a grain family that is gluten-free, lower in carbohydrates, and higher in protein, fiber, and minerals than most other grains.*



Millet varieties. Photo by Amrita Hazra.

### Methods and Findings

#### Test small-scale cultivation of different millets

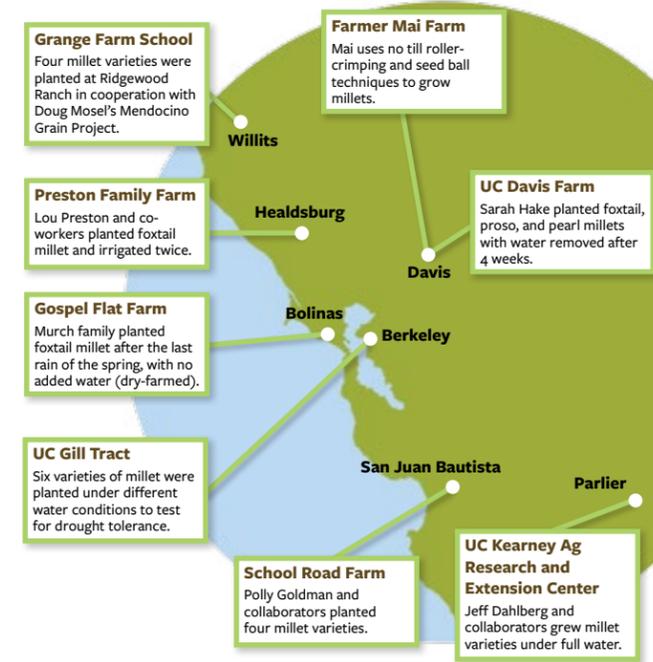
Alongside farmer-collaborators, the team tested the growth of different varieties of millets in different agroclimatic conditions in California. In the first year, three types of millets (Japanese, foxtail, and pearl) were tested, and in the second year, finger millet and two varieties of teff—also a millet—were added. TMP assisted farmers by providing planting guidelines. The TMP team tested the effect of three different field variables on the various millet varieties:

- watering regimes (irrigation, semi-irrigation, drought)
- soil conditions
- temperatures

At the end of the growing period, growth and yield of each millet variety were measured using:

- plant height
- number of millet heads
- length and weight of the seed heads

Numbers were correlated over two years, and a third year of planting is under way.



Map of project sites.

#### Collaborative partnerships with regional farmers

Through an annual exhibit, word of mouth, and media coverage of the project, several farmers and researchers in California, other states, and other countries are now interested in working with TMP to grow millets.

Altogether, the project worked with collaborators at eight sites in California to grow millet. In its third year, TMP will develop new collaborations across the United States and internationally. To encourage farmers to grow millets, the project also works to connect growers with local buyers, small businesses, and food manufacturers.

#### Outreach to Consumers

In 2015 and 2016, the Millet Project Exhibit introduced the team’s efforts to the public. TMP invited the Bay Area community to the UC Gill Tract to see the millet varieties being grown first-hand, taste food made with millets, and take home millet seeds to grow and grain to cook. The Millet Project team has developed several new millet-based products with potential for viability in the consumer marketplace and has collected valuable

feedback on the products using surveys. In addition to the Millet Exhibit, TMP members have presented the goals and successes of the project at several other venues and events, including Cal Day at UC Berkeley, the California Academy of Sciences, and Litquake in San Francisco. In the future, TMP members wish to carry out similar activities to popularize millets and millet-based food.

### Conclusions and Implications

In a comparison of different millet types grown in three Northern California locations to test for drought tolerance, it appears that pearl millet is likely to be the most drought-tolerant. The Millet Project has garnered interest among farmers, including those curious about growing millets in California, as well as farmers outside the state who already grow millet and would like to collaborate. Public outreach events served not only to introduce consumers to millet, but also to gather feedback on millet-based products. This ongoing work will hopefully serve to popularize millet as both a nutritious food and a drought-resistant grain crop.

### Research Team

*Principal Investigators:* Amrita Hazra (Indian Institute of Science Education and Research, Pune), Patricia Bubner (Energy Biosciences Institute), Peggy Lemaux (Plant and Molecular Biology; UC Cooperative Extension), Sarah Hake (USDA Plant Gene Expression Center)

*Additional team members:* Pedro Gonçalves (Postdoc, Plant and Microbial Biology), Rebecca Mackelprang (PhD candidate, Plant and Microbial Biology), Nicholas Mylet (MBA candidate, Haas Business School), Jyoti Taneja (Postdoc, Plant and Microbial Biology), Hailey Zhou, Elijah Bartolome, Eileen Wu, Alyssa Case, and Jerry Li (undergraduate students)

# An Agroecological Survey of Urban Farms in the Eastern Bay Area to Explore Their Potential to Enhance Food Security

This participatory community-based project was carried out over the summer and fall of 2014 in 21 farms and gardens in the East Bay (Alameda and Contra Costa Counties) to determine the main agronomic problems limiting production, and to help inform future outreach and training to increase production on these urban farms.

## Objectives

1. To determine cultural practices currently used by urban farmers and their effectiveness to overcome the identified limiting factors of soil constraints and pest, disease, and weed pressure
2. To quantify actual yields reached in various urban farms subjected to varied soil and pest management practices under different spatial and temporal combinations of crop species and varieties

This information will provide a baseline that can be used to plan a series of on-farm research trials to explore urban agriculture best practices and management designs to overcome production constraints and optimize yields.

## Methods

1. Farm managers were surveyed for soil and pest constraints and practices used. This survey included 21 urban farms and gardens and included school gardens, community gardens, and personal gardens that had been opened to the community.
2. Soil was sampled for nutrient and contaminant levels.
3. Two types of yield analysis were completed:
  - Productivity: Number of crop species, plants, and vigor was assessed to estimate productivity for a given quadrat (1m<sup>2</sup>)
  - Yield: Farmers were instructed to weigh all produce grown in specific plots (6m<sup>2</sup>)



People's Grocery California Hotel. Photo by Miguel Altieri.

## Results

### Soil

Nine out of ten sites had high soil fertility and exhibited good soil quality indicators. No samples contained elevated levels of total trace metals. Most of the surveyed gardeners followed agroecological practices to maintain soil fertility and quality.

### Water

The need for irrigation is often complicated by urban water prices and access. All but two survey respondents noted that if the farm itself was responsible for irrigation costs they would not be able to operate the farm. Of surveyed farms, 52% had an organization or partner that covered the costs of irrigation. Many farms are on city property and the city itself pays for irrigation needs. Only 10% of the farms (two) had wells that were used for irrigation; both were worried about the quality of the water as well as the possibility of the well running dry.

### On-farm animals

Less than half of the farms surveyed had on-farm animals (chickens, goats, ducks, worms, or bees). Raising chickens was the most popular (42%), as they ate much of the crop

residues and provided manure. The presence of animals had a positive correlation with on-farm soil building.

### Insect Pests

Many farmers were following best practices to promote beneficial insects for biological control, such as providing habitat strips, intercropping/planting flowers, and facilitating a more heterogeneous crop plan. Despite these measures, some pests such as cabbage aphids were prevalent. Generally, most farms recognized that the most effective pest repellants were good soil health, on-farm biodiversity, and strong plant vigor.

### Weeds

Many farmers struggled with weeds. However, the majority of farmers mentioned that methods used to control or prevent weeds are “effective” to “generally effective.” Some farmers take advantage of “weed” cover after plants get past their period of critical competition, but most allow presence and growth of aggressive weeds (amaranth, grasses) to levels that reduce crop yields. 30% of the quadrats sampled had some form of mulch. However, in many of these cases, the mulch cover was very light and was not effective in blocking weeds. Plots with a thick mulch showed high weed suppression.



### Productivity

Estimated productivity results varied among farms. This was most likely due to the diversity of goals, labor support, and organizational characteristics of each farm. Average estimated seasonal yield ranged from 3.43 kg/m<sup>2</sup> to 17.16 kg/m<sup>2</sup>, with a mean productivity of 7.09 kg/m<sup>2</sup> for all farms included in the study. This estimate is less than

the targeted 10 kg/m<sup>2</sup> of productivity (established by our team based on production levels reached by intermediate Cuban urban farms) and demonstrates the potential for increased yields in Bay Area urban agriculture with additional research, outreach, and institutional support. Low yields seemed associated with bad choice of crops, poor management, and low levels of crop diversity. A large number of heavy, high-producing crops (tomato, squash, and strawberry) resulted in high estimated productivity and are hypothesized to be a large factor in the variation seen in the data.



Community Garden “rating” system.

## Conclusions

By surveying 21 farms, the team evaluated the effectiveness of cultural practices used to overcome agronomic problems, as well as yield levels in farms undergoing different crop combinations and management practices. Such diagnosis has provided key information to start a series of on-farm research trials to define and scale-up via best agroecological soil and pest management practices, so as to overcome identified constraints and enhance yields.

## Research Team

Miguel Altieri, Céline Pallud, Joshua Arnold, Courtney Glettner, and Sarick Matzen (Environmental Science, Policy, and Management)

# Making the Road by Mapping: Informing Food System Transformation through Participatory Mapmaking

## Objectives

This project was initiated with the intention to map the organic strawberry supply chain for small producers. The research team aimed to explore how recently introduced regulations in water quality and food safety were impacting these farmers. However, during initial focus groups and informal interviews with organic farmers, the team found that the critical barrier to success was access to farmland rather than these regulations. Therefore the following research investigates barriers to farmland access among beginning farmers, and sheds light on the potential of participatory mapping to directly assist producers.

## Methods

1. Used participatory research to identify and map critical needs of small-scale, beginning organic strawberry farmers in California's Central Coast region, including 26 in-depth interviews, focus groups, and extensive participant observation.
2. Partnered with two community organizations, the Agriculture and Land Based-Training Association (ALBA) and California Farmlink, to creatively address land access needs for beginning farmers.
3. Conducted a course-based research project for undergraduate students in which students learned participatory mapping techniques and created several data-rich maps.
4. Presented these findings in novel, innovative, and visually captivating ways with the goals of:
  - a) informing specific policies/regulations and
  - b) providing small-scale producers with easily accessible caches of community-generated knowledge.



Partner farmer packing organic strawberries. Photo by Adam Calo

## Findings

### Sociocultural constraints impede land access

Beginning farmers are highly motivated and possess sophisticated farming skills, but ethnicity/cultural identity can play a role in landowner and farmer tenant relationships and restrictive lease arrangements.

### Limited farmland access impedes the viability of new, small-scale organic farmers

The inability to access suitable farmland may be a root cause for the significant number of ALBA graduates who eventually leave farming.

### A lack of information on land quality can lead to precarious leases

Unanticipated environmental factors can challenge the ability of farmers to realize their land's productive value. Tenants without prior knowledge about land suitability have less power to dictate terms of a lease agreement.

### Information on suitable land is generally inaccessible to smaller producers

Data concerning land ownership and associated agricultural attributes is publicly available, but it is often

aggregated and sold by private firms. This premium service is typically inaccessible to smaller producers.

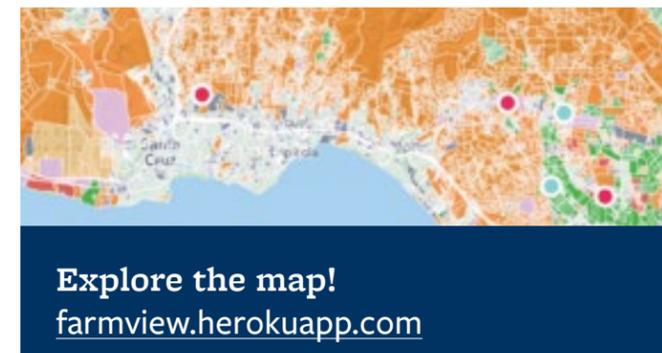
## Result: Farmland Monitoring Project

As a potential solution to these challenges, the research team developed a web-based participatory mapping tool to link beginning organic farmers with suitable, available parcels of Central Coast farmland. Developed in collaboration with ALBA and California Farmlink, this mapping tool is tailored to specific farmer needs and allows small-scale producers to better compete with larger firms. The Geographic Information System (GIS) map includes aggregate data on:

- Farmland quality, including water availability and production practices of nearby farms
- Tax assessor parcels
- Zoning codes
- Other publicly available data

The Farmland Monitoring Project (FMP) application can help producers identify viable farmland parcels and negotiate fair leases with landowners. Organizational advocates for small-scale organic farms in the region can now better match landowners with beginning farmers; this database of farmland availability will assist these organizations in their mission to help farmers transition from incubator programs into viable proprietorships with equitable lease/ownership arrangements.

The second goal of the FMP is to leverage the social power of mapping to facilitate alternative visions of farmland use. Articulated within the mapping tool is a map series that



Map showing parcel size of available farmland.

explores themes such as agricultural land use, conservation easements, land ownership trends, and demographic disparities in farm operators versus landowners.

## Key Accomplishments

- Published research findings in March 2016 in the *Journal of Agriculture, Food Systems, and Community Development* in an article titled, "After the Incubator: Factors Impeding Land Access Along the Path from Farmworker to Proprietor"
- Published an op-ed in the *San Francisco Chronicle* on October 18, 2016 titled, "For Farmers, This Land is Often Someone Else's"
- Presented the research at a Citizen Science conference as well as Harvard's Just Food conference
- Leveraged the Berkeley Food Institute Seed Grant funding to garner additional grant funding for participatory mapping technologies

## Research Team

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# Engaging Indigenous Farmworkers in Promoting Occupational Health and Safety

Agriculture ranks among the most dangerous industries in the United States. The 2015 fatal injury rate for agriculture, forestry, and fishing was the highest of any industrial sector, at 22.8 per 100,000 full-time equivalent workers compared to 3.38 per 100,000 for all workers in the US.<sup>1</sup> Furthermore, an average of 160 agricultural workers per day suffer lost-work-time injuries, 5% of which result in permanent impairment.<sup>2</sup>

Fair, safe, and dignified working conditions are critical elements of a healthy, just, diverse, and resilient food system. Achieving these conditions depends on empowered workers who are able to advocate for their rights and for needed changes. The ultimate goal of this work is transformative change in the role workers play in agricultural systems, such that workers are engaged and feel that they have the self-efficacy and agency to advocate for themselves.

## Objectives

1. Build the foundation for a sustainable and effective partnership among indigenous farmworkers, trusted indigenous organizations, and university researchers.
2. Assess indigenous farmworkers' and other stakeholders' perceptions and experiences about occupational health hazards, ability to take action, and challenges and opportunities for interventions.
3. Use findings from this formative research and partnership development phase to set the stage for an intervention research program that uses a theoretical framework of community-based participatory research, capacity building, and social network analysis.



Farmworkers in Oxnard, California. Photo by Alex Proimos.

## Methods

- Focus groups with indigenous farmworkers: two in Spanish and one in Mixtec (32 participants total)
- In-depth interviews with indigenous leaders and community representatives: five interviews with staff from Frente Indígena Organización Binacional, California Rural Legal Assistance, Inc., Central California Legal Services, United Farm Workers, and Centro Binacional para el Desarrollo Indígena Oaxaqueño

## Findings

### Health hazards and problems in the field

Workers reported a range of health hazards, including: falling from ladders, getting cut from shears and tools, heat, poor quality tools and equipment, pesticides sprayed near workers, slipping and falling, stress, working at fast pace, sexual harassment, and verbal abuse.

## Factors that influence risk

### Individual and interpersonal factors:

- Accepting hazardous conditions as the norm
- Distrust of people outside the indigenous community
- Lack of unity within crews
- Fear of retaliation

### Organizational and work site factors:

- Workers responsible for providing their own equipment (shears, gloves, boots, etc.)
- Lack of knowledge of indigenous languages
- Crew leader attitudes and discrimination
- Piece-rate system rewards fast work pace
- Lack of medical care if injured
- Enforcement of heat regulations (one focus group noted significant changes since Cal/OSHA began enforcing heat regulations)

## Extent to which workers feel they can advocate for themselves

There was a strong sense of vulnerability and powerlessness among many of the workers. Issues such as immigration status, language, and a perceived scarcity of available work contributed to the workers feeling like they had little standing or recourse in the face of unsafe working conditions, harsh treatment, or unfair practices.

In each group, some workers shared stories of actions taken, for example, to clarify wages and payment before starting work, to demand higher wages, or to call Cal/OSHA when they lacked water. Factors that may influence workers' ability to take action include their length of time in US, belief in having experience needed by employers, training as community educators, and personality. Pay rate and wage theft were reported as the most important issues among workers.

## Crew leaders' role in working conditions

Crew leaders play a critical role as a link between workers and contractors or growers. Many focus group participants felt that crew leaders often exhort employees

to work faster, have abusive attitudes, are not responsive to concerns, and are not well prepared for their role.

## Conclusions and Implications

The themes raised in the formative research stage highlight the importance of multiple points of intervention in order to enhance the health and well-being of indigenous farmworkers effectively, including efforts to influence growers and labor contractors to improve working conditions. Implications for future interventions with workers include framing occupational health as a social justice issue, working with trusted community members, and addressing language needs. In terms of policy, adequate enforcement of labor and safety regulations is critical in influencing employer behavior and policies that incentivize training and professional development for crew leaders. The research team was successful in establishing a partnership and is pursuing follow-up research opportunities.

## Research Team

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## References

1. *National Census of Fatal Occupational Injuries in 2015*. Bureau of Labor Statistics. December 16, 2016.
2. "Agricultural Safety." Centers for Disease Control and Prevention. December 15, 2014. Accessed April 28, 2017. <https://www.cdc.gov/niosh/topics/aginjury/>.

# Making the Business Case for Improved Farm Labor Conditions

The goal of this project is to generate much needed data to support the implementation and roll-out of the Equitable Food Initiative (EFI), a new voluntary certification program promoting reduced pesticide use, greater food safety, and improved farm labor conditions. EFI is a collaboration between farmworker unions, growers, retailers, and pesticide and food safety consumer advocacy organizations.

One of the underpinnings of EFI’s approach is the creation of “Leadership Teams” on EFI-certified farms that consist of growers, farm managers, field supervisors, and field workers. This model is meant to ensure that all stakeholders understand EFI standards, create channels of communication and collaboration, and empower workers to report instances of non-compliance.

## Objectives and Methods

### The Business Case for Improved Farm Labor Conditions

**Objective:** Develop a set of indicators that would identify and allow quantification of the costs and benefits of participating in EFI and (high-bar labor standards in general).

### EFI by the numbers

Includes **19 farms** in US, Canada and Mexico

Covers **10,000** field workers

Goal of **100,000** workers by 2022



Strawberry pickers at Sierra Farms, an EFI-certified farm. Photo by Diane Villadsen.

#### Methods:

1. Literature review
2. Key informant interviews with academics
3. Grower interviews
4. Farmworker focus groups

#### Effectiveness of Leadership Teams

**Objective:** Evaluate the strengths and weaknesses of EFI’s Leadership Team implementation on five farms in the United States and Mexico.

#### Methods:

1. Observation of 5-day Leadership Team training in Mexico
2. Observations of Leadership Team meetings
3. Focus groups and key informant interviews with growers, farm managers, Leadership Team members, non-Leadership Team farmworkers, and academics

## Findings

### The Business Case for Improved Farm Labor Conditions

A set of farm-level indicators were developed to assess impacts of improved labor conditions:

- Retention and access to a stable labor force
- Occupational health and safety
- Productivity
- Product quality
- Food safety
- Legal/lawsuits (wage and hour, sexual harassment, etc.)
- Marketing
- Worker satisfaction

### Effectiveness of Leadership Teams

#### Benefits for workers:

- Ability to advocate for improved conditions without fear of retaliation
- Greater transparency and awareness about farm management decisions
- Improved communications and reduced conflict
- More respectful treatment; culture of care
- Women and indigenous workers report reduced harassment and discrimination

#### Concerns:

- Awareness of specific labor standards is limited
- Potential for leadership “abuse” if not implemented well
- Role of women, indigenous workers, and contract workers on Leadership Teams
- Steep learning curve to successful implementation; additional support needed on some farms

#### Benefits for growers:

- Improved two-way communication; Leadership Teams convey information to and share feedback from field workers
- Growers are able to address workers’ concerns, which improves worker morale and satisfaction

- Leadership Teams often handle conflicts as they arise, freeing up supervisors’ time

#### Concerns:

- High training costs
- A lot of time spent “teaching to the test” to pass audit

## Conclusions and Implications

Growers and workers reported many benefits associated with participation in EFI, including high levels of satisfaction with the EFI Leadership Team model. In fact, growers indicated that they would maintain the model even if it were not an EFI requirement. Overall, our findings suggest that with meaningful participation of farmworkers and farmworker organizations, market-based initiatives can be a promising mechanism for improving farm labor conditions. However, they are not a substitute for the ability of collective bargaining to put workers on a more level playing field. Next steps for further research include conducting a pre- and post-assessment of farms joining EFI (based on the indicators developed in this research) and comparing social certification programs in the United States.

## Research Team

Christy Getz (Environmental Science, Policy, and Management; UC Cooperative Extension), Ron Strohlic (Nutrition Policy Institute; UC Agriculture and Natural Resources), and Maria Echaveste (Latin American Studies)

# The Subminimum Wage for Tipped Workers as a Human Rights Issue

This project sought to understand the subminimum wage paid to tipped restaurant workers in the United States through a human rights framework, to document how this subminimum wage violates several international human rights conventions, and to harness international legal standards as leverage to support domestic advocacy efforts on their behalf.

The International Human Rights Law Clinic and the Berkeley Food Labor Research Center collaborated with the Restaurant Opportunities Center United (ROC-United) to produce a human rights analysis of the subminimum wage for tipped restaurant workers in the United States. The report, entitled “Working Below the Line: How the Subminimum Wage for Tipped Restaurant Workers Violates International Human Rights Standards,” was released on Human Rights Day 2015 (December 10th).

## Objectives

Federal law sets the regular federal minimum wage, currently \$7.25 per hour, as well as the subminimum wage, which allows employers to pay workers who earn tips only \$2.13 an hour. Tipped restaurant workers in the 43 states with a subminimum wage are at least two times more likely to live in poverty than the general US population. The restaurant industry is the lowest-paying employer in the United States; according to the US Department of Labor, seven of the eleven lowest-paying and the two absolute lowest-paying jobs are restaurant jobs.

Advocacy groups are working at the state and federal level to eliminate the subminimum wage for tipped workers so that all workers are required to be paid “one fair wage.” Documenting subminimum wages as a violation of international human rights standards will provide significant grounding and draw media attention to legislative and legal efforts.



Photo credit: UC Berkeley Food Labor Research Center

## Key Activities

### Legal Research

Students with the International Human Rights Law Clinic developed a comprehensive legal analysis of the situation of tipped workers in the US under international law.

### Worker Interviews

The team collaborated with ROC-United to conduct interviews with over 30 workers in a dozen states where ROC has large membership, to hear a diversity of experiences with regard to different levels of state subminimum wages for tipped workers.

### Legal Analysis of Research Findings

Clinic students analysed the findings from the research and interviews to identify recurrent themes and patterns in the data and to identify potential violations of human rights obligations.

### Report Dissemination and Advocacy

The result was a published research report, “Working Below the Line: How the Subminimum Wage for Tipped Restaurant Workers Violates International Human Rights Standards.” The team organized two public symposia to disseminate the results.



From this research the team published a final report, “Working Below the Line: How the Subminimum Wage for Tipped Restaurant Workers Violates International Human Rights Standards.”

## “Working Below the Line”

The report finds that the subminimum wage system violates the human rights of workers, including:

- The right to an adequate standard of living
- The right to just and favorable remuneration
- The right to health (including the rights to food and housing)
- The prohibition against discrimination

The report recommends federal and state lawmakers incorporate international standards and best practices into law and policy to ensure tipped restaurant workers a living wage, access to affordable health care, and protection from sexual harassment and sex discrimination. It further recommends promotion of job training and advancement for women and workers of color.

## Report Release

The report was released in Washington, DC to an invited group of leading human rights and worker rights advocates. A separate briefing was provided to attendees of the Leadership Conference on Civil and Human Rights, a key civil society group advocating for workers’ rights at the national level. Through press outreach in advance of the event, the report received attention in *Forbes Magazine*.

In a second event held at UC Berkeley, the report authors spoke on a panel with Catherine Albiston, a Berkeley Law faculty member specializing in employment discrimination.

## Link to Policy

The research came at a time when several states and localities around the country were considering legislation and ballot initiatives that would eliminate the subminimum wage for tipped workers. At the federal level, Congress was considering a substantial increase in the subminimum wage for tipped workers. While the federal effort did not succeed, Maine became the eighth state to phase out a subminimum wage in 2016.

This report helped propel ROC-United’s national “One Fair Wage” Campaign to eliminate the subminimum wage on a state-by-state basis. The findings will continue to inform policymakers and voters of the ongoing human rights violations occurring within states that are operating under a subminimum wage system.

In California, there is no subminimum wage. However, some of the report’s human rights frameworks can be adapted to advance statewide advocacy to promote a living wage and a life with dignity for restaurant workers.



**Read the report!**

<https://food.berkeley.edu/working-below-the-line>

## Research Team

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*External Collaborators:* Restaurant Opportunities Centers United, Food Chain Workers Alliance

## Rethinking School Lunch in Oakland: Comprehensive School Meal Program Reform to Increase Equitable Access to Healthy Food, Establish Career Pathways in Sustainable Agriculture, and Improve Local Food Systems

**RESEARCH TEAM**

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Oakland Unified School  
District

**ABSTRACT**

Urban school meal programs present a significant opportunity to implement food systems reform strategies that both increase a vulnerable population’s access to nutritious food and support agroecology. This case study examines the partnership formed between the Oakland Unified School District (OUSD) and the Center for Ecoliteracy (CEL) to implement Rethinking School Lunch Oakland (RSLO), a systems change effort addressing food access, health, educational, environmental, and social issues simultaneously through school meal program reform. Implementation of RSLO presented many financial, social, and political hurdles.

This study examines OUSD and CEL’s individual and collective responses to these challenges faced in the implementation of comprehensive school food system reform, the progress of incremental programmatic changes under RSLO, and the processes used by OUSD and its partners to determine how to best implement the multiple facets of RSLO. This research will offer an analysis that can inform and educate other school districts interested in attempting similar change, potentially having significant implications for urban food systems reform and school lunch programs nationally.

## Gender Dynamics and SNAP/CalFresh Enrollment among Immigrant Households in California

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California Association  
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**ABSTRACT**

The research explores gender dynamics as a barrier to participation in the Supplemental Nutrition Assistance Program (SNAP)/CalFresh among eligible Latino immigrant households in California. There are numerous barriers to SNAP participation, including long applications, burdensome verification requirements, onerous reporting procedures, and perceived stigma. Additional barriers affecting immigrants include language concerns about impacts on immigration status. An additional yet largely unexplored barrier is the role of gender dynamics, particularly in immigrant communities. First-person reports by food stamp outreach providers

suggest that it is not uncommon for immigrant Latina women to start the SNAP enrollment process without completion due to opposition from their husbands, who are concerned about stigma and impacts on immigration status. This exploratory research, which will be based on qualitative data collection, will shed light on an unexplored barrier to SNAP participation. A greater understanding of this phenomenon will contribute to the development of more effective policies and outreach strategies, with the goal of increasing SNAP enrollment rates in California.

## The US Agricultural Social Certification Landscape: A Comparative Perspective

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**ABSTRACT**

Efforts to improve farm labor conditions in the US historically have focused on regulation and unionization. While these efforts have led to improvements in farm labor wages and conditions over the years, recent decades have been characterized by a decline in farm labor union organizing and inadequate enforcement of many regulations.

In the last few years, there has been a rise in an alternative paradigm focused on market-based efforts to promote improved farm labor conditions in the US. The social certification landscape has evolved to include initiatives targeting large, industrial farms employing the majority of US agricultural workers, with great potential for widespread impacts. Current initiatives are significantly different from each other in nature. With agricultural social certification in the US in its pilot stages, a deeper understanding of similarities and differences among

these labels and approaches will shed critical light on the potential for voluntary social certification to substantively improve farm labor conditions in the coming years.

BFI’s research investigates how the principle social certification labels compare and contrast, including an analysis of their approach, objectives, standards, evaluation, reach, and to what extent the programs are tracking impacts on farmworker conditions, including occupational safety and health, income, and job satisfaction. The project also analyzes the competitive landscape and explores perceptions of the different labels from up and down the supply chain, investigates buyer plans regarding social certification requirements, and explores potential impacts on buyer and grower adoption.

## Promoting Soil Health Innovations: Barriers, Motivations, Enabling Conditions

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**Additional External Partners (TBD)**

**ABSTRACT**

Across the US and within California, there has been a surge of interest in “soil health,” brought on by major droughts and deluges that have afflicted certain parts of the country in recent years. BFI plans to draw on this growing interest to develop innovative policy analysis and recommendations to support diversified farming systems as a solution to boost soil health. Over 1.5 years, BFI will conduct a comprehensive analysis of the barriers, motivations, enabling conditions, and innovations that affect the ability of farmers in California to implement diversified and agroecological farming practices that advance beneficial soil health outcomes. To accomplish this goal, BFI will 1) review social science

and grey literature, 2) survey UC Cooperative Extension and Resource Conservation District personnel, and 3) supplement this survey with interviews of a sample of farmers representing different crops and soil regions across California. Throughout the project, BFI will convene partners and key stakeholders to obtain input on the project, stay abreast on related and complementary efforts, and best position the results of the project to influence state and federal policy. Outputs will include a synthesis report, policy briefs, cost-return studies, and information aimed at legislators, government policymakers, and agricultural industry actors.



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