

Transforming the Campus Foodscape Through Participatory Mapping

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ABSTRACT University campuses are dynamic foodscapes that meet the needs of thousands of diverse community members. These foodscapes are difficult to comprehend in their entirety, and inequities based on race, class, gender and gender identity, sexual orientation, dis/ability, and other forms of marginalization often remain unidentified and unaddressed. Since 2015, the UC Berkeley Foodscape Mapping Project has emerged as a model of participatory, justice-oriented food systems education. Drawing on critical pedagogy principles, it uses the Berkeley campus as a living laboratory for students, staff, and faculty to generate food systems knowledge. We trace the project's development to show how what started as a set of workshops to address campus climate problems grew into a major mapping effort and advocacy projects that aim to improve the campus food system. Early on, workshops found that the biggest barrier to changing our campus food system was understanding the system itself: who the individual and departmental decision makers are and how different parts of the foodscape interact. Foodscape mapping is one possible pathway for changing a campus food system. This pathway was chosen because it could create a much-needed data foundation for advocacy at UC Berkeley. We discuss the concept of mapping and work through the process of building the Campus Food Players map. Several examples of Spotlight Maps and a practical policy advocacy project are presented to show the variety of outputs. Finally, we analyze financial, personnel, and pedagogical resources needed to realize the map, along with important constraints on its development. Readers will learn about campus foodscape mapping and be better equipped to develop projects at their own campuses. **KEYWORDS** pedagogy, equity, diversity, university campuses, participatory mapping, foodscape

INTRODUCTION

University campuses are dynamic foodscapes that meet the needs of thousands of diverse community members. Like many complex systems, foodscapes are difficult to comprehend in their entirety, and inequities based on race, class, gender and gender identity, sexual orientation, dis/ability, and other forms of marginalization often remain unidentified and unaddressed. Since 2015, for example, universities across the United States have contended with the fact that their students are facing a hunger crisis. Nationally, 36% of students at U.S. universities report food insecurity [1]. Hunger does not affect all students equally: Underrepresented minority, LGBTQ+, foster youth, and first-generation college students are far more likely to suffer from food insecurity than other students.

Yet campus foodscapes are more than the food available to eat: In addition to dining services and other food procurement, campus foodscapes encompass administrative decisions and initiatives, teaching, research, support services, campus gardens, and student organizations and activism. How do inequities in food access mirror inequities in access in each of these foodscape nodes? For example, which students are able to participate in food and agricultural coursework and research opportunities and who benefits from campus garden activities? Or asked another way, how does structural racism and other marginalization play out in a campus foodscape? At a fundamental level, who are the key decision makers and where are the points of leverage for change?

Participatory foodscape mapping is one powerful way to tackle these questions, as part of broader projects to

address structural inequities in universities as social institutions. In this case, we describe the making of the UC Berkeley Foodscape Mapping Project, a democratically produced, interactive digital map that offers extensive data on the structural factors affecting diversity, equity, and inclusion across campus activities and units. Developed through ongoing community dialogue and student research projects beginning in 2015, the map both reveals barriers to the full participation of historically marginalized campus members in food-related learning and practice and highlights opportunities for—and successes in—overcoming such obstacles. The Foodscape Mapping Project also offers comprehensive policy recommendations, and since 2018, the project team has focused on targeted programmatic development and engagement with high-level campus decision makers to enact change.

Moreover, the Foodscape Mapping Project serves as a model of participatory, justice-oriented food systems education. Drawing on critical pedagogy principles, it uses the Berkeley campus as a living laboratory for students, staff, and faculty to generate food systems knowledge and engage in hands-on education and action. This approach aligns with Paulo Freire's notion of praxis: Knowledge is generated and regenerated through action, reflection, and dialogue [2]. As of spring 2020, 38 undergraduate and graduate students have engaged with the project through in-depth research fellowships, 132 additional students have participated in data collection and visualization, and over 2,500 other members of the UC Berkeley community have contributed to the project via surveys, interviews, crowdsourced data, and public events.

Crucial to the Foodscape Mapping Project's philosophy is an iterative and collaborative design process. A commitment to democratic participation has guided decisions on which areas of the campus foodscape to investigate, which tools to use for that exploration, and what questions to ask. This process makes for a meandering journey yet has stayed grounded in furthering the goals of providing experiential learning opportunities and pragmatically increasing equity and inclusion in the UC Berkeley food system. We will trace the project's development to show how what started as a set of workshops to address campus climate problems grew into a robust pedagogical platform that seeded a major mapping effort, a policy report, new courses, and advocacy projects that aim to improve the campus food system.

We will also share the particular conditions that enabled this project to succeed, as well as reflect on the project's challenges, to suggest questions that students, staff, and faculty at other universities might ask themselves to undertake similar work.

CASE EXAMINATION

First Phase: Campus Climate: A Call to Action

The UC Berkeley foodscape serves over 60,000 community members.¹ A 2013 survey revealed that around 25% of the university community had experienced exclusion through intimidation, bullying, or isolation based on some aspect of their identity. Community members from groups marginalized in the broader U.S. society face far higher levels of discrimination. In particular, Black, Indigenous, and Latinx—the so-called underrepresented minority, or to use Asai's [3] powerful term, persons excluded because of their ethnicity or race (PEER)²—LGBTQ+, and multiminority respondents felt greater exclusion than White people, other people of color, and heterosexual respondents. Moreover, staff felt less sense of belonging on campus than students or faculty [4]. This is consistent with literature on the experience of PEER students [5], faculty [6], and staff [7] at other Historically White Colleges and Universities. The data also align with literature on the experience of LGBTQ+ people on college campuses [8].

In the mid-2000s, like many universities across the country, UC Berkeley was experiencing a surge of interest in food and agriculture, as reflected by new academic and educational programming, student-led initiatives, and community outreach activities.³ In 2013, the Berkeley Food Institute (BFI) launched as an interdisciplinary

1. In spring 2020, the Berkeley campus consisted of 30,411 undergraduate students; 11,667 graduate students, 1,511 regular faculty; 1,401 other faculty (i.e., lecturers and visiting faculty); 3,286 other academics (i.e., postdocs, staff researchers, librarians, and cooperative extension titles); 8,369 staff (operational, technical, professional, managerial, and executive); 4,160 affiliates/nonemployees (includes visiting scholars and independent contractors); and countless community members and alumni who frequent campus regularly. See <https://calanswers.berkeley.edu> [26].

2. UC Berkeley's Division of Equity and Inclusion defines underrepresented groups as African American, Chicano/Latino, and Native American/Alaska Native. This corresponds to Asai's definition of PEERS.

3. Food and agriculture have been core to UC Berkeley education and research since the university was founded in 1868 as the first land-grant college in the Western United States. In its 150+ years, Berkeley has been a leader in agri-food systems topics, from the discovery of vitamins E and K in the 1920–1930s to soil science during the Dust Bowl years of the 1930s to biological control during the 1950–1970s to urban agriculture and agroecology since the 1980s.

hub aimed at creating diverse, just, resilient, and healthy food systems through cross-cutting research, policy, community engagement, and educational programs. At the same time, the Student Organic Garden, which dated back to 1971 but had been fallow for many years, was revitalized by undergraduate students keen to learn hands-on food production skills. Not only did the students want to teach each other practical agricultural knowledge, they wanted such experiential learning to be integrated into Berkeley's academic curriculum. Students asked the just-formed BFI to lead efforts to create an undergraduate Food Systems Minor centered on "critically examining issues of contemporary food and agriculture from a whole-systems perspective" [9]. The minor launched in spring 2015.

And yet, as excitement for new food-centered activities grew, it was clear that many community members felt they were excluded. Although the new food programs theoretically embraced equity and inclusion, BFI and many others recognized that the campus food movement perpetuated structural racism and other forms of marginalization. Food-related faculty and students did not reflect the diversity of the university community nor of the groups who are most affected by systemic injustices in the food system: In particular, Black, Indigenous, and other faculty of color were notably missing.⁴

At the same time, UC Berkeley was beginning to understand its hunger crisis: 43% of undergraduate and 23% of graduate students experience food insecurity [10]. Students are forced to choose between paying for food, housing, and other basic needs while attending school in one of the most expensive areas nationwide. In fall 2013, many campus partners joined forces to begin to address the systemic causes of student hunger. To provide emergency relief, the campus established a food assistance program through the Office of Financial Aid and Scholarships and launched the UC Berkeley Food Pantry in summer 2014.

These developments created a strategic opportunity to address the need to transform our campus climate—to fully integrate diversity, equity, and inclusion into Berkeley's food systems programs, capacity building, and

4. In 2017, the Students of Color Environmental Collective took aim at the Rausser College of Natural Resources—UC Berkeley's historic land-grant arm—with an open letter and campaign #EnvironmentalismSoWhite. See <https://serc.berkeley.edu/letter-to-the-environmental-community-from-students-of-color/> [27].

campaigns. In late 2014, the Division of Equity and Inclusion called for projects to enhance the campus climate by making it "a more equitable and inclusive place to study and work" [11]. A consortium of the BFI, Othering and Belonging Institute, Centers for Educational Equity and Excellence, and Multicultural Community Center⁵ applied for and received a US\$10,000 grant and, in spring 2015, began work on the "Building Equitable and Inclusive Food Systems at UC Berkeley" project.

Our initial aim was to create spaces for open dialogue and critical thinking, thus cultivating a climate of inclusivity, equity, and diversity in food and agricultural research, teaching, service delivery, and activism at UC Berkeley. By engaging in a deeply reflective process, the project team sought to explore the structures and systems that produced and perpetuated exclusion. Using grant funds, the four collaborating organizations hired two graduate student and three undergraduate student fellows, who, together with five organizational staff,⁶ developed a 2-day workshop for the members of UC Berkeley food-related units and organizations. Exercises focused on cultivating emotional intelligence and a more comprehensive understanding of issues of race, class, gender and gender identity, sexual orientation, dis/ability, and other forms of marginalization in the Berkeley foodscape. The workshops began by naming together our collective understanding of the terms equity, inclusion, diversity, and intersectionality. We then presented on structural racialization, implicit bias, and institutional causes of inequities in global and U.S. food systems, before turning to our own campus. We identified dozens of specific examples of exclusionary practices in the Berkeley foodscape and worked through three case studies of how we might enact structural change. Forty-five staff, faculty, and undergraduate and graduate students attended, and participants reflected that they experienced true dialogue across their differing positionalities. The organizing team responded to requests to

5. Ten additional food-related teaching departments, student groups, service units, and research institutes signed on as project supporters.

6. For the first year, the leadership team consisted of these 10 members. The five staff leads incorporated the project into their existing jobs, whereas the student leaders were hired for the project. After the first year, Rosalie Z. Fanshel has served as the sole staff project lead, and Alastair Iles joined as faculty principal investigator. Neither Rosalie nor Alastair has been paid on dedicated project funds. Every year, two to six students have been paid and/or received coursework credit to participate in the leadership team.

hold a second students of color-only workshop, which student members led entirely.

The workshops identified that *the biggest barrier to changing our campus food system was understanding the system itself*: who the players, individual, and departmental decision makers are and how different parts of the campus food landscape—or “foodscape”—interact. We could have launched immediately into advocacy on a particular pressing food topic, but workshop participants knew from their years of work on disjointed projects that it was time to build an empirical basis of knowledge on the foodscape itself to guide effective action. We chose to do this through a foodscape mapping effort to generate missing data.

Second Phase: The Foodscape Mapping Project

After identifying the necessity of making a foodscape map as the next step of the project, the leadership team did not have a fixed notion of what a “map” is. None of the members of the project team were geographers. Although it is clearly a weakness that we did not build the mapping stage of the project on a robust theoretical grounding, our naivete also meant we were quite open and flexible in developing our definition of mapping while centering equity and inclusion as primary values. Mapping work is never politically neutral. As Crampton and Krygier [12] state in their discussion of critical cartography, “Maps are active; they actively construct knowledge, they exercise power and they can be a powerful means of promoting social change” (p. 15).

We established early that a map really meant *maps*: We wanted to make an interactive website that would use multiple visual methodologies and tell the story of UC Berkeley’s foodscape from as many perspectives as possible, thus emphasizing power as multidirectional [13, 14]. We also wanted the maps to include voices as well as visual information, and as such our definition of mapping would include recorded oral histories and videos. We drew inspiration from many resources, such as Guerrilla Cartography’s *Food: An Atlas* [15], the Anti-Eviction Mapping Project [16], Metrocosm [17], and others.

DEFINING THE “FOODSCAPE”

The idea of foodscapes offers a convenient framework for viewing the complex settings where we, as individuals, meet food and meals in our daily life surroundings and the notion offers a good frame for understanding and

analyzing the food interactions we engage in with the environment, with other individuals, with food and meals, as well as with food-related strategies, ideas, policies and meanings. (Mikkelsen [18], p. 213)

Mackendrick [19] adds that the foodscape encompasses “the places and spaces where you acquire food, prepare food, talk about food, or generally gather some sort of meaning from food” (p. 16). Knowledge production about food is a particularly salient aspect of a university foodscape, as are the programs (or lack thereof) that support students to thrive while in school.

Student activism is a unique element of a university foodscape—undergraduate students in particular are often discovering new values and identities, and the experimental, intellectual space of the university and structure of student clubs provide fertile ground for exploring food topics. In Rosalie’s experience, common topics for food-related student activism on college campuses include sustainability and corporate responsibility of ingredients in dining halls, animal rights, food security resources for campus and surrounding community populations, hands-on food production on university land, food waste, and solidarity with labor and food sovereignty movements.

Our project team settled on a working definition of our campus foodscape as: “Entities that make up food-related learning and practice, encompassing (but is not limited to) teaching, research, student organizations and activism, administrative decisions and initiatives, support services, campus gardens, dining services, eateries, catering, and other procurement.” After much discussion, we decided to bound our map to the campus itself, knowing that no physical or intellectual space can be disentangled from networks of capital, culture, or policy, near and far. This decision created limits on fully mapping food procurement or waste, for example, but we deemed these limitations as helpful for student learning through focused, deep-dive engagement.

CAMPUS FOOD PLAYERS. Having solidified our concept of the campus foodscape, we decided that rather than begin with a spatial map—which might be the presumed place to start—we would start with an organizational chart of all decision-making entities on campus that influenced the foodscape: the Campus Food Players. The first step was to actually name all the food-related campus entities that our workshops had identified as so

challenging to understand. For the first iteration of the Campus Food Players, the project team spent multiple sessions with a stack of post-it pads, naming and arranging more than 200 entities that touched food in some way. The second iteration was essentially a digital post-it pad created with the program mural.y. In both these iterations, we focused on making sure every entity was named and sorting them into rough categories by type.

Student fellows then focused on sleuthing out campus reporting structures for each of the players. This was no easy task—some administrative bodies share organizational charts on their unit websites, while others were only “vaguely known” through Rosalie’s own institutional knowledge from years of serving as a Berkeley staff person or discovered through one-on-one conversations with program staff. In the third iteration, we wrestled with how to visualize power relations between the entities named. In showing the chain of command, we specifically wanted to emphasize that as power consolidated in higher levels of administration, it became whiter and more male (2 years into the project, in 2017, a White woman was appointed Berkeley’s first female chancellor). However, a limitation in naming racialized and gendered power was our inability to obtain demographic data specific to individual players in foodscape nodes. Although we had deidentified demographic data for faculty and staff at large, we could not connect these data to the areas of campus in our study. We knew we would not get statistically meaningful data if we attempted to conduct our own survey. Both the challenges in finding data to map reporting lines and the lack of transparency of the positionalities of individuals within hierarchies are structural barriers to equity and inclusion: If you can’t “see” racism and other inequities, you can’t change them.

We decided to proceed using a topological map structure to show the relationship between entities with the amount of data we were able to obtain. This is the type of map used for transit systems. Thus, each “highest level” unit, such as a vice chancellor’s office, was visualized as a “hub” in the system, with each smaller unit as “stops” along a transit line. Our goal here was to visualize a diffuse, weblike version of power rather than a hierarchical one. This reflected our own scattered experience of attempting to collect the desired data and also responded to pushback by undergraduate students to show how individuals, no matter their positionality, could move through the system

as changemakers. This topological map would have been a fine end point. However, the project team felt that in mapping power as diffuse, we did not provide map users with enough clarity on where they could enter the system to exert pressure on things they wanted to change. We therefore tried a fourth iteration as an animated Euler Diagram. This version showed the highest unit of reporting—the Chancellor—as the largest circle, with subsequent units as smaller and smaller nesting units within it. A user could click on each unit to expand into greater detail. With this version, we gained a visual metaphor for the centralizing nature of power, but we lost the ability to see the whole system at once.

In the fifth and final iteration of the Campus Food Players map, we decided that a traditional organizational chart, while hierarchical in its visualization, would actually provide users with the clearest understanding of reporting structures, so that they could exert pressure up a chain of command to create change. Organizing entities in this way enables users to see at a glance how decisions and funding travel through the system. However, to acknowledge multidirectional power, we opted for a left-to-right horizontal tree layout rather than a vertical one. Although many entities—including the BFI itself—have shared governance structures, we mapped according to immediate administrative lines of reporting. We also simplified entities in Berkeley’s foodscape into four nodes, each with its own color code: academic units, student leadership groups, service units, and physical facilities. These four nodes became an organizing structure for organizing all the other maps within the Foodscape Map website. (See figures 1 and 2 for all the Campus Food Players iterations.) Our original desire to show how White patriarchy dominated the foodscape was a goal we could not accomplish in the end.

GEOGRAPHIC ASSET MAP. After creating the Campus Food Players diagram, we did make a geographic asset map that campus community members can use to find the location of resources to support their wellness and learning. These include basic needs services, gardens, eateries, lactation rooms, public microwaves, water refill stations, and zero waste stations. After many conversations, we decided to use geographic mapping as a direct resource empowerment tool rather than one highlighting impoverishment and inequities in physical distribution of assets. In their discussion of the mapping of food “deserts,” De

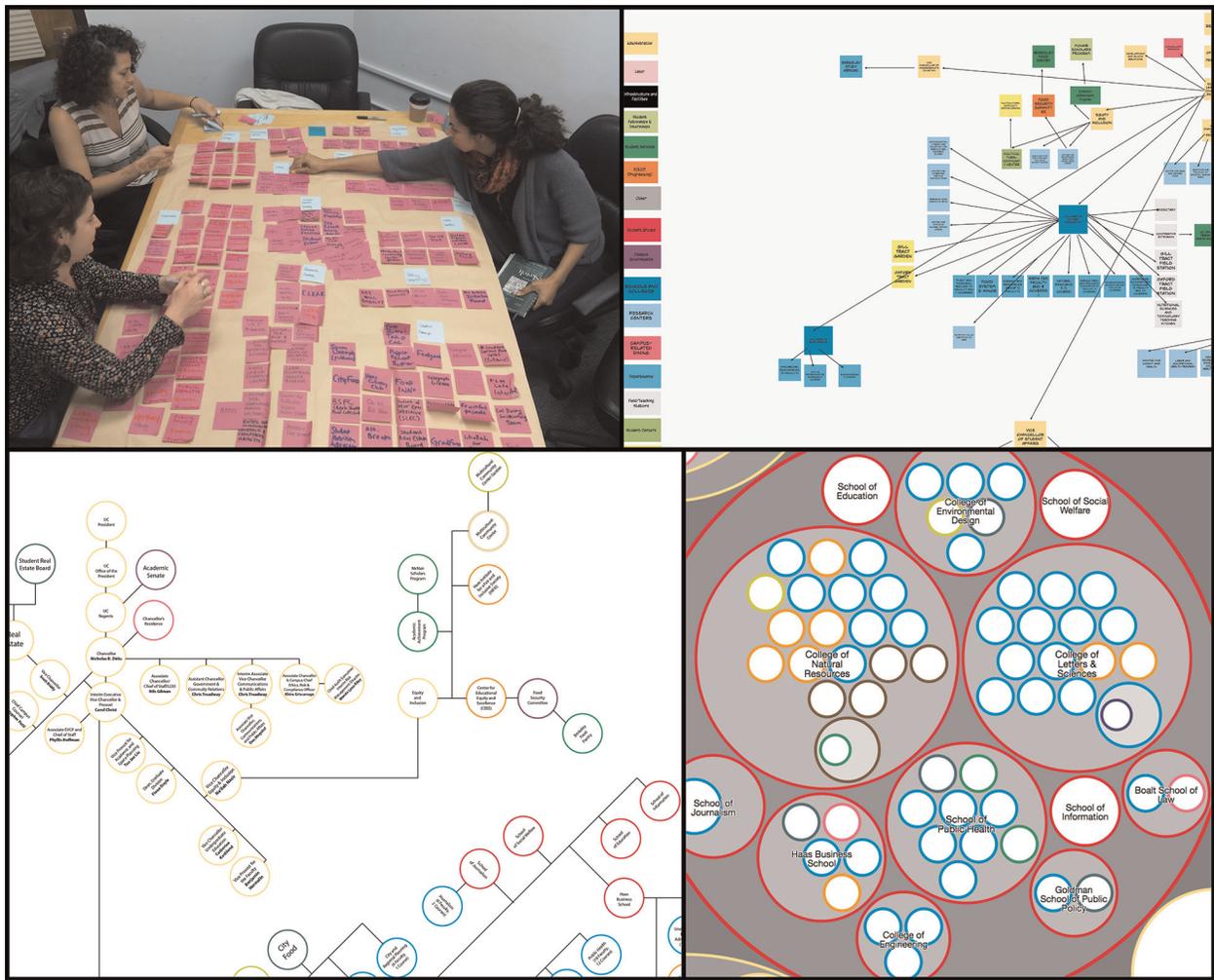


FIGURE 1. Campus Food Players Iterations 1–4. Top, from left: (1) Melina Packer, Nadia Barhoum, and Kara Young making the first iteration of Campus Food Players. (2) Detail of the second iteration, created with mural.y. Bottom, from left: (3) Detail of the third iteration, as a topological map. (4) Detail of the fourth iteration, as an animated Euler Diagram.

Master and Daniels [20] highlight the deprivation gaze that such maps typically use without questioning the underlying assumptions of the cartographers or the power embedded in the mapping tools themselves. Certainly, inequities are implicitly visible in our geographic map. Looking at the location of a given resource, such as lactation rooms, it is obvious that some sections of campus provide greater access than others. In the case of microwaves and refill stations, we made an additional map focused specifically on the uneven distribution of resources. Other nongeographic maps in the overall Foodscape Map also spotlight barriers to inclusion. The geographic asset map, however, imparts a sense of abundance. Between the 150+ students who explored our physical campus to collect data for the map and the thousands of people who have visited the geographic asset map

page, we hope that it has contributed to our community’s well-being.

To construct the geographic asset map, we used relatively simple open source mapping software, in alignment with our democratic values. These were Leaflet, OpenStreetMap, and MapBox Studio. The data are stored in Google Sheets; while not open source, it is a free tool with a low learning curve. The Foodscape Mapping Project subsequently received a grant in December 2019 from the UC Berkeley Student Technology Fund⁷ to integrate the geographic map into Berkeley Mobile, a student-developed UC Berkeley mobile application. This

7. The Student Technology Fund is a student-initiated fee referendum governed by a student-majority, all-volunteer committee. See <https://techfund.berkeley.edu/> [28].

Berkeley Food Institute Campus Food Players

Spring 2018

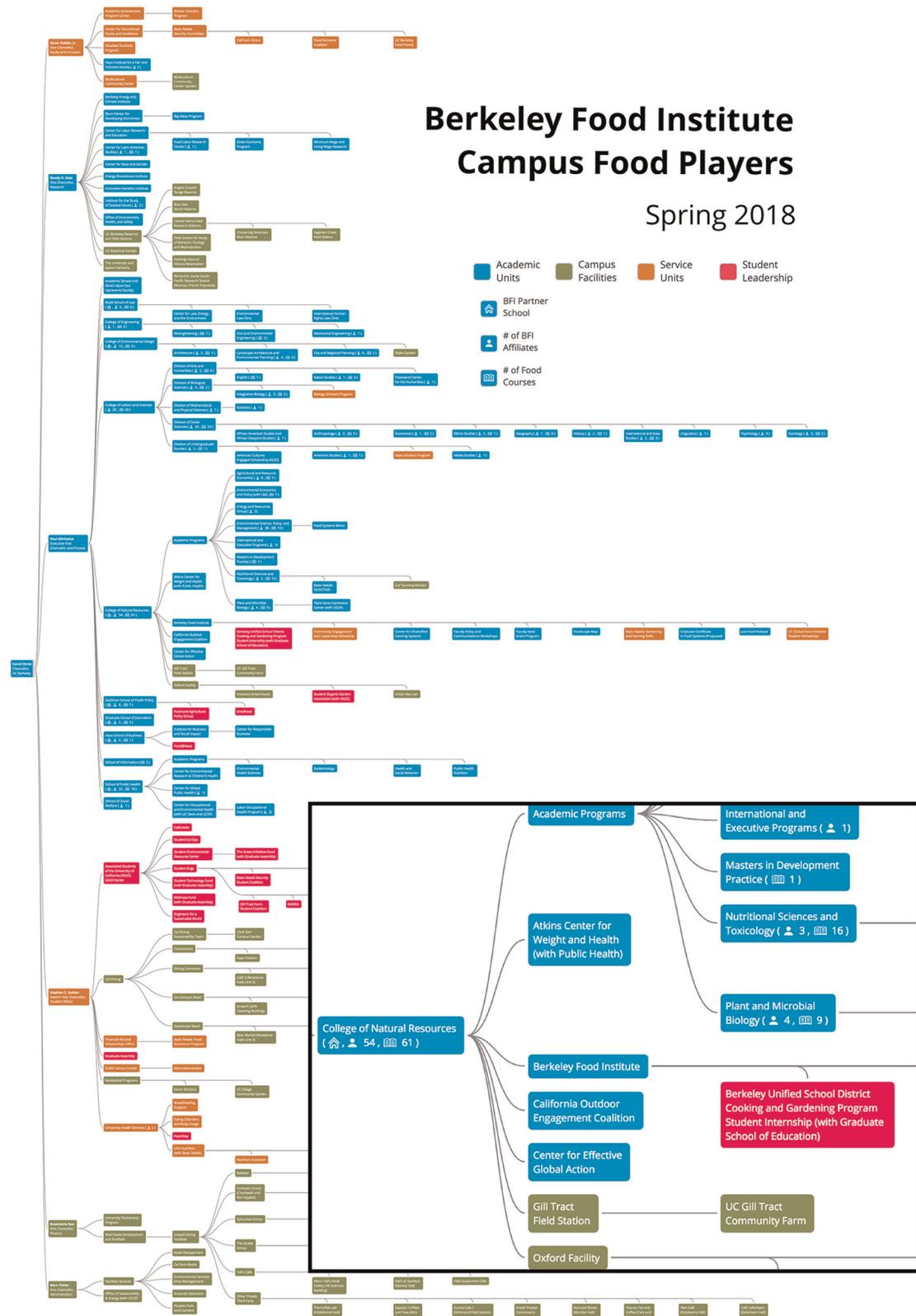


FIGURE 2. Campus Food Players final iteration. The final campus food players, with the animated organizational chart fully expanded. The inset features a detail.

smartphone integration will improve access to the resources and through a location-enabled, at your fingertips user experience.⁸

SPOTLIGHT MAPS. The Campus Food Players and Geographic Asset Map attempt to show the big picture of our campus foodscape. Between 2016 and 2019, we made 18 additional maps that explicitly highlight structural inequalities and/or celebrate successes in specific aspects of the campus foodscape. We chose the areas to explore through open mapping sessions, the particular interests of student fellows, and synergistic opportunities that arose. The resulting 18 spotlight maps are only a fraction of the 60+ aspects of the UC Berkeley foodscape we considered mapping (see “Practical Considerations” section).

Not only did we want the map *product* to include multiple visual and auditory perspectives, our values directed that the mapmaking *process* uplifted diverse learning styles and disciplines. Thus, the map employed a spectrum of social science research methods, including surveys, content analysis of archival documents, key informant interviews, oral histories, and crowdsourcing. On the Foodscape Map website, we organized these 18 spotlight maps into the four categories of academic units, campus facilities, service units, and student leadership. See table 1 for details on each focused map, data collection methods, and map type.

Here are three brief examples of the spotlight maps. See <https://food.berkeley.edu/foodscape/map/> [21] and click through each navigation tab to explore them all.

FOOD AND AGRICULTURE COURSES. Through analysis of historic course catalogues, our research team found that roughly 13,500 food and agriculture courses have been taught at Berkeley between 1900 and 2010.⁹ Many course descriptions feature eugenics, colonial resource extraction, gender inequality, and explicit class and racial segregation via distinction between higher and vocational food systems education. The legacy of racist and sexist epistemologies that continue to inform food and agricultural teaching and research is a symbolic violence [22]

8. Mobile app integration was set to be released in summer 2020, but the campus closure due to COVID-19 has delayed a full launch of the app.

9. Course catalogues back to 1868 are available in the UC Berkeley library digital archives, but we worked with a data set that had been converted from images to a dynamic database that started in 1900 and ended in 2010.

that Berkeley and other universities should directly address through their diversity, equity, and inclusion blueprints. The Food and Agriculture Courses map features two data visualizations: an animated time line that highlights key moments in Berkeley’s food and agriculture development and particular classes that reveal (in)equities in pedagogy and a stream graph that traces disciplinary changes and quantity of food and agriculture coursework over time.

FOOD-RELATED STUDENT GROUPS. Semistructured questionnaires with members of food-related student groups disclosed a disconnect between perceptions of diversity and inclusivity within groups and actual member composition. Although respondents overwhelmingly reported that their organizations had no equity issues, answers to demographic questions showed that participants in food groups are significantly more White and female-identified and receive less financial aid than the Berkeley student population at large. We visualized the data as animated donut charts and illustrated graphics. We also created five video portraits and one audio portrait of student group leaders.

ACCESSIBILITY AT RESEARCH SPACES. Foodscape Map data revealed that students with disabilities face systemic discrimination while pursuing field-based agricultural coursework and research, as none of Berkeley’s agricultural facilities comply with federal and state disability laws. Many physical, financial, and knowledge barriers exclude disabled students—for example, professors who are unsympathetic in providing accommodations in farm fields for practical labs. An artistically illustrated graphic explains barriers and proposed solutions with relevant resource links and also links to the undergraduate thesis from which the research was drawn.

Third Phase: Policy and Program Recommendations

With 2 years of intensive on-the-ground data collection and visualization completed, in 2018, the project pivoted from mapping empirical evidence to developing practical solutions. We released a 45-page report analyzing map data to offer strategies for implementing policy and programmatic changes across 13 specific areas [23]. For each area, we summarize findings from the data, provide a set of policy and program recommendations, and list “campus influencers” who are key players in affecting change. The goal of the policy report was to help drive campaigns for pressing campus bureaucracies to make

TABLE 1. Spotlight Maps.

Map Name	Data Collection Method	Map Type
Academic units		
Accessibility at research spaces	Site surveys, legal analysis, and interviews	Illustrated and animated graphic
Food and agriculture courses	Content analysis	Animated time line and stream graph
Hot spot: Oxford Tract (<i>an agricultural field station slated for housing development; cross-listed with campus facilities</i>)	Environmental and social cost-benefit analysis	Narrative with photos and tables
Campus facilities		
Campus gardens	Biophysical and social surveys	Animated satellite view map
Campus garden stories	Oral history, interviews, and critical reflection	Audio and video portraits; narrative report
Hot spot: Oxford Tract (<i>an agricultural field station slated for housing development; cross-listed with academic units</i>)	Environmental and social cost-benefit analysis	Narrative with photos and tables
Microwaves and water refill stations	Crowdsourcing (microwaves) and physical survey (water refill stations)	Illustrated and animated graphic
Sustainable and just catering	Policy and best practices analysis	Resource list
UC field stations	Web directory searches	Geographic Information System mapping, using Carto
Service units		
Coalition for healthy campus food and beverages	Community meetings, physical survey	Narrative
Basic needs: Food security	Deidentified pantry usage logs and program enrollment records; physical food weighing	Illustrated and animated graphic
From garden to pantry	Physical food weighing	Illustrated and animated graphic; bar graph and pie charts
University health services stories	Oral history	Audio portraits
Wellness program for high-risk jobs	Deidentified health screening and program enrollment records	Narrative with photos, tables, and bar graphs
Student leadership		
Greek life	Semistructured questionnaire	Illustrated graphic and pie charts
Learning through our food	Oral history	Watercolor paintings and audio portraits
Student cooperatives	Semistructured questionnaire	Illustrated graphic and pie charts
Student groups	Semistructured questionnaire	Illustrated graphic and animated donut charts
Student group stories	Open-ended interview and oral history	Video and audio portraits

strategic, high-impact interventions in the campus food system. Prior to publishing the final report, we circulated a draft version and held a policy town hall at which over a dozen student fellows presented Foodscape Map data. Sixty attendees offered feedback, which we incorporated into the final report. The report has been widely circulated on the Berkeley campus and to other universities at

conference presentations; as of May 2020, 1,000 hard copies have been distributed, and the online version has been downloaded 750 times.

Fourth Phase: Advocacy and Programmatic Change

After the release of the report, in fall 2018, the Foodscape Mapping Project entered a fourth phase of

attempting to spark systematic change based on our recommendations. Here, we were effectively returning full circle to the questions that we had begun with 3 years prior, this time with data and a strong community process to draw on. How do we cultivate a climate of inclusivity, equity, and diversity in food and agricultural research, teaching, service delivery, and activism at UC Berkeley? The 2018–2019 leadership team¹⁰ collectively chose four areas to focus on and spent the next academic year pragmatically working to create an impact on each issue. The choices were made based on the combination of expertise and interest of the particular group of student fellows and issues that had energetically entered public dialogue across different corners of campus. Two areas gained significant traction and continue to the present: developing programs to address food and housing insecurity among Berkeley’s professional staff and addressing Berkeley’s exclusive pouring rights contract with PepsiCo for campus beverage service.¹¹

Here, we describe the work on campus beverage service, as it demonstrates creative integration across educational, procurement, and student group nodes of the campus foodscape. Berkeley is approaching the end of a 10-year contract with PepsiCo for exclusive beverage service across campus dining halls, vending machines, and athletics concessions. Pepsi’s sponsorship provides US\$1.3 million in annual operational funds to campus. Yet, the project team recognized that sugar-sweetened beverages and the multinational companies that market them are responsible for various negative health, environmental, and labor impacts that disproportionately affect low-income communities of color. We began with broad-based coalition-building to understand the needs and values of various campus populations, including units currently funded by the contract. We then held a 24-h “innovation challenge” to garner public attention and invite students to come up with alternative solutions to the PepsiCo contract by thinking at the intersection of health and business: considering human and planetary health—and health equity—together with short- and long-term financial costs and benefits and corporate

responsibility. After the innovation challenge, faculty and administrators suggested Rosalie teach a semester-long class on the topic.

In fall 2019, 10 interdisciplinary undergraduate and graduate students participated in the three-unit case design course and presented their solutions in a public forum attended by 50 people, including the campus decision makers on beverage procurement and contracts. Simultaneously, undergraduate students launched a “Pour Out Pepsi” campaign through student government, the Associated Students of the University of California, with the support of multiple student groups. They held several demonstrations, circulated an online petition signed by over 1,000 members of campus, and passed a resolution through the student government to prevent renewed contracts with multinational beverage companies. The decision on future beverage service is currently underway, overseen by a working group whose members are publicly listed. Unlike when the PepsiCo contract was negotiated in 2011, this time student, health, and sustainability representatives are on the decision-making committee.

Practical Considerations

The Foodscape Mapping Project has been a 5-year (and counting) community process to generate and represent knowledge that did not exist on equity and inclusion in the campus foodscape and to use this knowledge to catalyze change. Although the map findings may be specific to UC Berkeley, the project structure can be applied at other universities and perhaps other institutional settings as well. Below are practical considerations for beginning a foodscape mapping project at your institution.

DECIDING WHAT TO MAP. At Berkeley, we mapped a decision-making structure and geographic asset map of the comprehensive foodscape and made spotlight maps to focus on individual nodes. Within the overarching lens of power intersecting with race, class, gender and gender identity, sexual orientation, and dis/ability, several factors led to decisions on what aspects of the foodscape to explore. From a content interest perspective, factors included input garnered during public map brainstorm sessions, interests of individual student team members, knowledge strengths of the project leader, and “hot spot” topics circulating in the campus community. From a practical feasibility perspective, achievable project scales, funding sources, and alignment with existing course projects contributed to decisions on which nodes to map. We

10. Consisting of Rosalie Z. Fanshel and Alastair Iles, two graduate student fellows, and two undergraduate student fellows.

11. The two other areas we dedicated energy to were addressing the racial and class inequities among the food experiences of students participating in the fraternity and sorority system and increasing “Sustainable and Just” catering for campus events. In both these areas, we feel we made modest progress but have not yet catalyzed systemic changes.

TABLE 2. Structure of Educational Opportunities for Students.

Opportunity Name	Type	Number of Participants (as of May 2020)
Primary opportunities		
Undergraduate Research Apprenticeship Program (College of Letters and Science)	Undergraduate course credit	9
Sponsored Projects for Undergraduate Research (Rausser College of Natural Resources)	Undergraduate course credit	6
Independent and group research units (across Berkeley colleges and schools)	Undergraduate and graduate course credit	7
Honors theses (Rausser College of Natural Resources)	Undergraduate course credit	2
Semester/yearlong fellowships	Paid undergraduate and graduate positions with the Berkeley Food Institute	14
	Primary opportunities participant subtotal	38
Additional opportunities		
Short-term jobs	Paid undergraduate and graduate positions with the Berkeley Food Institute	15
Coursework projects	Undergraduate course projects	100
Volunteers	Undergraduate volunteer participation via student organizations and student government	17
		132
Total participants		170

were not concerned with making a single “cohesive” map—as discussed above, we explicitly aimed to tell the story of Berkeley’s foodscape from as many perspectives and sensory experiences as possible. See table 1 and the UC Berkeley Foodscape Map for examples of maps you might consider for your institution.

PEDAGOGICAL RESOURCES. The Foodscape Mapping Project leveraged several campus learning structures to provide meaningful, hands-on educational opportunities for students. These include paid undergraduate and graduate student fellowships through the BFI, course credit through existing undergraduate research apprenticeship programs, and undergraduate honors theses (see table 2). “Primary opportunities” were mentored by Project manager Rosalie.¹² Generally, students worked on individual projects or in teams of two to four, committed 5–10 h per week, and held weekly or biweekly meetings with

12. In the case of two undergraduate honors theses, students were mentored by Alastair Iles.

Rosalie. These students were key members of the leadership team during their time on the project: They were cocreators in the map vision, research design, data collection and/or visualization, and advocacy activities. Students worked on the project for a minimum of one semester and up to 2 years. This is a level of dedication and time commitment beyond most university courses or campus jobs, and even these long-term commitments were sometimes insufficient to complete “thick” data [24]. Thirty-eight students have participated in the Foodscape Mapping Project as of May 2020 through the primary opportunity structure. Students were undergraduate, master’s, and PhD students from fields as diverse as sociology, geography, society and environment, environmental economics and policy, public policy, public health, nutritional sciences, urban studies, city and regional planning, geography, American studies, and more.

As of May 2020, 132 students participated in “additional opportunities,” which were shorter term commitments. Students participating in paid opportunities worked closely with Rosalie and primary student

collaborators on specific aspects of the map, especially visualization and animation of data collected by the primary students. Many of the students who undertook these opportunities were in computer science; they were excited to practice their coding skills to create animated graphics and in the process were exposed to thinking about food systems for the first time. Additional opportunities for course credit were typically final projects for related classes, where the students worked primarily with the course faculty. Volunteer projects were student-initiated via food-related student organizations and student government. These students also held periodic meetings with Rosalie.

Student leaders shared their work in public forums—graduate students attended two off-campus conferences, and both graduate and undergraduate students presented at Berkeley town halls and workshops. The Foodscape Mapping Project thus provided a suite of learning experiences: Students developed analytical, food systems, diversity, equity, and inclusion, cartographic, and public presentation skills. Students were drawn to participate in the project because of its alignment with their own passions, the focus on making a tangible difference in their immediate community, and the opportunity to have close mentorship through a small research course and/or a paid position.

Over 2,500 additional members of the campus community have participated in the Foodscape Mapping Project by contributing to data via surveys, crowdsourcing, interviews, and participation in workshops and town halls. Thirty-six community members contributed financially to a 2016 crowdfunding campaign. As of May 2020, the Foodscape Map has had 15,500 views from across the globe.

FINANCIAL AND STAFFING RESOURCES. A staff project manager and creative cobbling of small funding resources were critical to the Foodscape Mapping Project. Rosalie’s position as manager of the BFI’s educational and community engagement programs, and the Institute’s values on diversity, equity, and inclusion, provided the opportunity to embark on the project. Rosalie dedicated 15–25% of her paid staff hours to the project from 2015 to 2019 and volunteered an average of an additional 2 h per week.¹³ Her time on this aspect of

13. Note that Rosalie was a full-time UC Berkeley professional staff for 10 years through fall 2019, at which point she reduced her staff appointment to 60% to begin a concurrent PhD in Berkeley’s Department of

BFI’s programming was a trade-off for other projects that might have been undertaken instead. Alastair Iles, who was a founding faculty codirector at BFI, was the Foodscape Mapping Project’s faculty principal investigator “champion” to provide legitimacy on campus, sponsor student coursework credit, and serve as a conduit for some of the project funds.

BFI applied to several small campus grants, held a crowdfunding campaign, and used a University of California systemwide fellowship program to fund paid student positions¹⁴ (see Funding). Berkeley’s undergraduate research apprenticeship programs come with modest funding (US\$300–US\$500 per student) for faculty to dedicate to research projects. These funds paid for technical development of the map’s web platform, public workshops, and survey incentives. Many aspects of the Foodscape Mapping Project were done without funding, relying instead on dedication of students and staff from across campus to the project goals, and synergy with other campus programs. BFI’s function as a “hub” for food systems activities on campus and Rosalie’s deliberate focus on coalition-building were key to managing the project on such a small budget. Alternative funding options would be to apply for larger internal or external grants, such as through a campus’s research office or the U.S. Department of Agriculture, but these would have other costs and barriers to weigh.

CONCLUSION

Dynamic Continuation: Reflections on the Foodscape Mapping Project

While telling the story of UC Berkeley Foodscape Mapping Project, it is important to the project team to be self-reflexive on areas where we could have been more impactful. Below are some of the challenges we have identified, which you might think through for how you could ameliorate these in your own setting.

PROJECT TEAM DIVERSITY AND ANTI-RACIST PRACTICES.

During the first year of the Campus Climate grant funding, the leadership team was predominantly Black,

Environmental, Science, Policy, and Management. Rosalie’s doctoral work grew out of the Foodscape Mapping Project; the project thus provided an educational opportunity even for its staff manager.

14. Funding was never at a level that could cover tuition and fees for graduate student positions. This is something we bemoaned from an equity perspective—graduate student fellows had to have other sources of funding to cover their tuition fees and thus were working on the project as an *extra* job.

TABLE 3. Public Events.

Date	Title	Number of Attendees
November 19, 2015	Building Equitable and Inclusive Food Systems at UC Berkeley Workshop Part 1	40
December 8, 2015	Building Equitable and Inclusive Food Systems at UC Berkeley Workshop Part 2	25
April 14, 2016	Students of Color Gathering for Food Justice	15
June 6, 2016	Association for the Study of Food and Society/Agriculture, Food and Human Values/Canadian Association of Food Studies Annual Conference Presentation	25
July 30, 2016	Sustainable Agriculture Education Association Conference Presentation	25
October 26, 2016	Building Equitable and Inclusive Food Systems Faculty Panel	85
November 16, 2016	Open Mapping Session	10
April 19, 2017	Foodscape Map Launch	35
June 27, 2017	California Higher Education Sustainability Summit Conference Presentation	45
April 26, 2018	Foodscape Mapping Project Policy Town Hall	60
October 25, 2018	College of Environmental Design “Design and Activism” Course Presentation	150
December 14, 2018	University of Melbourne Law School Invited Presentation	35
March 3, 2019	Greek Life Food Experience Roundtable	40
March 11-21, 2019	Sustainable and Just Catering Outreach Week	240
April 10, 2019	Greek Life and Hillel Community Meal and Workshop	50
April 26-27, 2019	Healthy Campus Food and Beverages Innovation Challenge	70
July 7, 2019	Berkeley Event Planner Sustainable and Just Catering Training	100
November 15, 2019	Australian Food, Society, and Culture Network Conference Presentation	30
November 26, 2019	Department of Environmental Science, Policy, and Management “Agricultural Ecology” Course Presentation	75
December 5, 2019	College of Environmental Design “Design and Activism” Course Presentation	150
December 8, 2019	Healthy Campus Food and Beverages Case Design Final Pitch Session	50
December 10, 2019	Menus of Change Invited Presentation	60
Total attendees		1,415

Indigenous, and People of Color (BIPOC) and diverse in terms of gender identity, sexual orientation, dis/ability, age, and campus position. However, as the project progressed, the two permanent leadership positions have been held by Rosalie, a White staff member, and Alastair, a White faculty member. Although both of us face other marginalizations—Rosalie is queer, working class, and Jewish, and Alastair is Berkeley’s only ladder-rank deaf faculty—White supremacy awards us institutional privilege that we must constantly examine in a project aimed at equity and inclusion. Although graduate and undergraduate student team members have consistently been majority people of color, with a significant number of PEER and LGBTQ+ students, continuous leadership from BIPOC staff and faculty would have strengthened the project. Rosalie and

Alastair also recognize that they overlooked the crucial step of cocreating explicit collaborative guidelines for anti-racist praxis with each new group of students who joined the project.

CODING KNOWLEDGE LIMITATIONS. As a project centered on student learning, the Foodscape Map served as an opportunity for a dozen undergraduate students to apply their computer science skills to creatively visualize data. The students often envisioned a more sophisticated user experience than their technical coding skills allowed for, and none of the map pages are mobile-optimized nor, ironically, compatible with accessibility software such as screen readers. The project would have greatly benefited from a faculty member or advanced graduate student to serve as a computer science mentor.

From the initial campus climate workshops through each iteration of the Foodscape Map, the project was the effort of professional staff and students and run through a research center rather than an academic department. Alastair was the only faculty consistently involved, and his engagement was not institutionally recognized as teaching or research work. Many faculty members did attend the first day of our initial 2015 workshops (but not the second) and public town halls throughout the project, but they were otherwise absent. Even in the case of students receiving course credit for project work, Rosalie served as the day-to-day mentor through her staff position at the BFI, with faculty simply serving as instructors of record. This type of pedagogical project is ideally suited for an undergraduate seminar course taught each semester, housed in a department such as sociology, American Studies, or UC Berkeley's Environmental Science, Policy, and Management. At a large university, there is usually no institutional structure or incentive for faculty to take on this type of teaching.

EVALUATING IMPACT. Throughout the Foodscape Mapping Project, we have measured “success” by the number of community members engaged in learning experiences, number of contributors to map data, and public visibility of the project through analytics of the map website itself, media attention, and events (see table 3). We are also tracking positive institutional change that we can directly credit to the project, such as significant food security resources now available to Berkeley staff in need and the creation of a Food and Basic Needs Committee within the fraternities and sororities.

How do we empirically and systematically measure whether Berkeley has an increased climate of inclusivity, equity, and diversity in food and agricultural research, teaching, service delivery, and activism as a result of the Foodscape Mapping Project? The original motivation for the project was data on UC Berkeley's campus climate, as measured through a 2013 in-depth semistructured questionnaire answered by 24% of the campus population. In 2019, the Division of Equity and Inclusion conducted the next iteration of this survey, the My Experience Survey, and results will be released publicly some time in late 2020. Neither survey was focused specifically on the campus foodscape, though the 2019 survey for the first time had questions related to food security. A computer-based 45-min survey is an

imperfect measurement tool with built-in inequities. For example, the My Experience Survey [25] received very low response rates from Berkeley's low-wage service staff despite efforts by the Staff Basic Needs Working Group (a committee formed as a result of the Foodscape Mapping Project) to hold in-person, paper-based trilingual survey clinics.

Further measurement specific to food and agriculture programs is needed to fully evaluate the impact of the Foodscape Mapping Project. By definition, a campus foodscape is complex and multimodal—it is embedded in every aspect of the university experience. This makes impact challenging to measure in an integrated manner. We are confident in saying that at the very least, the Foodscape Mapping Project created a vital and ongoing public conversation on equity and inclusion in UC Berkeley's food system. The discussion is widespread, passionate, and with many threads. This in itself is an ongoing impact.

CASE STUDY QUESTIONS

Here are some questions to stimulate discussion about what you can do at your own campus.

1. What do you know about diversity, equity, and inclusion on your own campus, both from data your campus provides and from your lived experience?
2. How do you see broader issues of diversity, equity, and inclusion on your campus playing out specifically in the foodscape?
3. After reading about the process UC Berkeley engaged in to address inequities in our campus food system, what do you think you would have done differently?
4. If you were to embark on a foodscape mapping project at your campus, what would be your first step? Why would you start there?
5. How would you define the “foodscape” for your campus?
6. What are the opportunities and shortcomings of mapping as an approach to campus equity and inclusion?
7. What resources does your university have to support such a project? Examples could be

structures for engaged learning, financial resources, staff or faculty positions, and so on.

8. Who are the decision makers that would need to be engaged to move from mapping to policy and program change?
9. How would you evaluate project “success”?

AUTHOR CONTRIBUTIONS

Rosalie Z. Fanshel planned and wrote the original draft and edited this case. She served as project lead on conceptualization, methodology, investigation, supervision and mentorship of student researchers, analysis and data curation, visualization, project administration, and funding acquisition.

Alastair Iles conceived, reviewed, and edited this case. He served as project champion and contributed to conceptualization, methodology, supervision and mentorship of student researchers, and funding acquisition.

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COMPETING INTERESTS

The authors have declared that no competing interests exist.

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College of Letters and Science Undergraduate Research Apprenticeship Program (Iles)	2016–2019	US\$2,700
University of California Office of the President Global Food Initiative [‡] (Fanshel)	2015–2017	US\$12,000
Othering and Belonging Institute Faculty Cluster Intervention Grant (Iles and Fanshel)	2018–2019	US\$12,250
The Green Initiative Fund Mini Grant (Fanshel)	2018	US\$4,169
Alastair Iles research funds	2018	US\$3,000
Student Technology Fund (Fanshel)	2019	US\$3,675
Total		US\$59,092

[†]All sources are UC Berkeley departments unless otherwise noted.

[‡]University of California systemwide funding source.

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