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Growing city farming together: A 5-year Bay Area urban agriculture & food systems needs assessment with models, barriers and recommendations to shape community engaged programming

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Recommended Citation

Bennaton, Rob; Contreras, Julio; and Lamoureaux, Yulia Baltusova (2022). "Growing city farming together: A 5-year Bay Area urban agriculture & food systems needs assessment with models, barriers and recommendations to shape community engaged programming," *Urban Food Systems Symposium*. <https://newprairiepress.org/ufss/2022/proceedings/11>



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Abstract

Urban agriculture and food systems in the California Bay Area are multifaceted and intricate. There are many successful models and inspirational stories of coalition building, thousands of pounds of local food production, and overall community empowerment. Our presentation will highlight case examples, challenges, barriers, and recommendations in the University of California Cooperative Extension's (UCCE) Urban Ag & Food Systems Program's (UAFSP) 2019 Bay Area Needs Assessment.

The needs assessment summarizes and discusses research, outreach projects and extension services the UAFSP conducted during the years 2014-2019 in five Bay Area Counties. It comprises both quantitative and qualitative information gathered from soil analysis, research, participatory research, workshop surveys, site visits and technical extension services. Projects include grant projects like USDA Beginning Farmer & Rancher Development Program workshops across California. Also, the program conducted an urban farmer's mini-grant program with the Alameda County Resources Conservation District designed with low entry and an easy application process. The UAFSP's projects provide a unique snapshot of urban food production systems and challenges growing in urban environments in disenfranchised communities experiencing higher levels of food insecurity and environmental injustice.

One of the assessment's conclusions was that land access, technical education and economic viability remain the highest challenges faced by urban agriculture and food systems groups. Most groups thrived on the social, cultural and services aspects of producing local affordable food, transforming lives, and serving important roles in their communities as food hubs, green spaces, and empowering sites. But these accomplishments were difficult to achieve due to the economic and political aspects that create an eb and flow of activity depending on grants, available resources, community, and political stakeholders. A suggested framework for supporting local food production and enhancing local food systems that presents itself is to support urban residents in becoming community food producers (AB 1990), who can not only grow local food but also safely and legally prepare and package value added products through CA Cottage Food Act (AB 1616); in the process boosting the local economy and food system by becoming a micro enterprise home kitchen operation (AB 626).

Growing city farming together: A 5-year Bay Area urban agriculture & food systems needs assessment with models, barriers and recommendations to shape community engaged programming

Abstract

Urban agriculture and food systems in the California Bay Area are multifaceted and intricate. There are many successful models and inspirational stories of coalition building, thousands of pounds of local food production, and outstanding community development. Our 2022 Urban Food Systems Symposium presentation highlighted exemplary models, challenges, barriers, and recommendations in the University of California Cooperative Extension's (UCCE) Urban Ag & Food Systems Program's (UAFSP) 2019 Bay Area Needs Assessment.

The needs assessment summarizes and discusses research, outreach projects and extension educational programs the UAFSP conducted during the years 2014-2019 in five Bay Area Counties. It comprises both quantitative and qualitative information gathered from soil analysis, literature-research, participatory action/focus group research, workshop surveys, site visits and technical assistance/ extension educational programs and services. Efforts included grant projects like the UCANR Urban Ag Workshops Series and USDA Beginning Farmer & Rancher Development Program workshops across California. The program conducted an urban farmer's mini-grant program partnering with the Alameda County Resources Conservation District designed with low entry-barriers and an easy application process. The UAFSP's projects provide a unique snapshot of urban food production systems and challenges of food growing in urban environments in disenfranchised communities experiencing higher levels of food insecurity and environmental injustice.

The assessment's conclusions were that land access, technical education and economic viability remain the highest challenges and greatest needs faced by urban farming and food systems advocacy groups. Most groups thrived on the social, cultural and service-learning components of cultivating food and urban greening, filling important roles in their communities as food hubs, green spaces, sites for community interactions and resource distribution. California's existing sustainable food laws uplift opportunities for greater local food access and, when coupled with comprehensive county or municipal community food security programs can amplify healthy food systems, healthy county residents and healthy local environments by addressing local needs.

INTRODUCTION

Even though California leads the U.S. in agricultural production by supplying more than half the United States' produce, its residents experience a food access paradox by suffering some of the highest levels of food insecurity in the nation (California Food Policy Advocates, 2019; Poulsen, 2012). 4.7 million Californians are food insecure, averaging out to 1 in 8 residents (CaFoodBanks, 2019). In Alameda County alone, 16% of all children experience food insecurity at some point during the year (UCSF Children's Hospital Oakland, 2019). Thirteen percent of Alameda residents are also living under the Federal Poverty Level, but by properly accounting for the Bay Area higher costs of living and rent, realistically, every 1 in 3 residents are not making ends meet (All In Alameda County, 2019). A better assessment for poverty that accounts for a higher cost of living is the self-sufficiency standard for the Bay Area (Center for Women's Welfare University of Washington, 2023). In Contra Costa County, this standard finds that one fourth (26%) of families are experiencing poverty (Contra Costa County, 2019). Over one tenth (13%) of homeowners and close to one fifth (17%) of renters in San Francisco County were severely rent burdened in 2015-2019 (Policy Map, 2019). Based on the income characteristics by race and ethnicity, White

residents of the Bay Area Counties had over four times the average income of Black residents, \$140 thousand compared to \$34 thousand in 2015-2019 respectively, while Hispanic and Latino residents had \$77 thousand average income (Policy Map, 2019).

Extensive research has shown how urban agriculture can improve food security and provide multiple stacked social, health, environmental and economic benefits to program participants, stakeholders and consumers (Surls et al., 2015; Golden, 2013; Bellows, Brown, & Smit 2005; Blair, Giesecke, & Sherman, 1991). Urban agriculture also faces challenges and risks due to development pressures, gentrification/eco-gentrification and high costs of operation (Pallana, 2014; Surls et al., 2015). This assessment studies urban farmer's needs given their community-based assets, operational resource-use, organizational structure as business, non-profit, or volunteer groups, challenges they face with land development pressures, potential displacement or insufficient support from city or county programs. Research, educational programs, and committed participation in food policy councils and systems alliances to meet needs and provide resources was conducted across the San Francisco Bay Area region in five counties: Alameda, Contra Costa Santa Clara, San Mateo and San Francisco.

This needs assessment also focuses on urban farmers' capacity to uplift food production sites as local neighborhood resources concurrently serving as open spaces for emergency resilience, cultural expression, therapeutic healing, nutritional wellness, diversity, equity, inclusion and inter-generational learning (Campbell & Wiesen, 2009). These sites take the form of urban farms, communities, schools, therapeutic and/or faith-based farms or gardens cultivated by formal or informally organized groups. Urban farming groups and their sites often do not fit well into rigid categories, but, rather, each site or group's model varies by place and by how it is managed over time. Regardless of whether self-defined as an urban farm, community garden, or other facility-institutional or school-garden or farm, these spaces are multifunctional and have integrated agro-ecological benefits (Gomez-Villarion & Briz, 2022; Napawan, 2014). This assessment's final analyses and recommendations summarize local and regional urban agriculture challenges with proposed solutions that can increase local food access and enhance environmental quality, particularly focused on low-income communities.

The University of California Cooperative Extension and Urban Agriculture

The University of California Cooperative Extension (UCCE), a large component of University of California Agriculture and Natural Resources (UCANR), plays a significant role in providing applied research and extension education-based training and information for farmers in California (Farm Training Programs, 2020). Urban agriculture is uniquely placed within UCCE in its ability to encompass and transect, either directly through technical assistance or through education, across all of the five strategic initiatives of University of California Agriculture and Natural Resources (Strategic Initiative Leaders and Panels, 2019; 4-H Youth Development Program, 2019; Reynolds, 2011). However, some researchers agree that urban agriculture is still an area needing further analysis and programming resources (Diekmann et al. 2017; Surls et al., 2013; Reynolds, 2011; Reynolds, 2009). This needs assessment was informally conducted from May 2014 to October 2019 across five San Francisco Bay Area counties, with the following goals:

- a) to collaborate with urban farmers, community gardeners, food system advocates and associated community groups to further identify priorities, issues and needs that can sustain their impacts, successes, viability and longevity.
- b) to summarize and share results from several prior assessments, field workshops, policy briefings and reports for better supporting urban growers with resources and educational programming opportunities to help them sustain their operations and local outreach.
- c) to publicly map existing urban farms to uplift land tenure-capacity through a 'Mapped Group Review Process' for helping food growing groups sustain operations as community resources, grow the urban agriculture network across organizations, and reduce costs through better liability risk management plus natural resource conservation.

- d) to partner with other local groups with comparably similar missions hosting online and publicly open events-calendars for informal resource sharing, growing and sustaining urban farming networks, amplifying voices policies supporting greater food and land access, and mitigating long term socioeconomic inequities in low-income San Francisco Bay Area neighborhoods.

The intricacies of urban agriculture

At its basis in developed nations, urban agriculture is food production in highly developed human - engineered habitats with dense populations that have previously relied on conventional agriculture to supply most urban residents' food (Diekmann et al. 2020). Urban agriculture models have evolved to take many different forms and can vary globally and even from city to city. Urban farming goals can range from a focus on producing local heirloom varieties to community empowerment that combats food insecurity and other inequalities. For historically disenfranchised working-class communities, urban agriculture can be a source of land access and a space for community organizing (Siegnier, Sowerwine, & Acey, 2018; Golden, 2013; Blair, Giesecke, & Sherman, 1991). There are multifaceted benefits in the areas of health, social, economic, and environmental scopes of operations (Annotated Bibliography, 2020; UA at a Glance, 2020; Holland, 2004). Research has found that community gardens bring together people from different kinds of social, economic, and racial backgrounds which generate civic engagement and democratic collaboration (Campbell & Wiesen, 2009; Patel, 1991).

Urban farms do more than local food production in that land stewardship can lead to physical and mental health benefits experienced by its participants, while also directly supporting food access and security (Armstrong, 2000; Teig et al. 2009). Research has found that individuals were "3.5 times more likely to consume fruits and vegetables at least five times per day" if they themselves gardened or had a close family member or friend who gardened (Alaimo et al., 2008). By growing food closer to consumers, especially those who live in food deserts, urban agriculture becomes a tool to improve food insecurity which can also directly combat health problems like diabetes, obesity, and mental health (Patel, 1991; All Authors, Journal of Therapeutic Horticulture, 1986-2022). Gardeners and farmers are directly connected to their local food system and build connections that extend beyond the gardening site (Teig et al. 2009).

Studies have found that urban agriculture, as part of a sustainable food system with local food production, processing, and selling can increase economic growth and development by providing jobs and reducing food costs (Conner et al., 2008, Surls, 2015). Many Community Supported Agriculture (CSA) and non-profit organizations provide youth jobs and training (Golden, 2013). There is also increased economic vitality with new jobs creation, increased property value and overall increased capital for residents and revenue for the city (Pallana, 2014). Although urban agriculture is a lot smaller in scale compared to large farmland with riparian zones and larger ecosystems, there are still multiple benefits and environmental impacts that diversified sustainable practices can provide (Altieri, 1999). Direct benefits include providing habitats for pollinators, migrating birds, native species as well as many other ecosystem and ecological services that come from urban agriculture's diverse farming systems (Kremen & Miles, 2012).

Challenges and barriers to urban agriculture

Urban agricultural practitioners face many challenges extending from economic, environmental, social and political history. And rooted in the exclusion of agriculture from cities. Land use-blight and inadequate urban design that did not integrate agriculture and ecological landscaping forced growers to invest in redesigning site infrastructure, seek technical assistance and education for soil and water resource management, business planning, administration and marketing, production and distribution of food products (Reynolds, 2009; Surls, et al., 2013). Irrigation systems and the price of water, with municipal and residential water prices being higher compared to rural and large farm areas, is a common economic issue (Reynolds, 2009). Another

challenge to urban agricultural success is access to green space, land access and tenure, which is becoming more difficult as economic pressures arise leading to gentrification in dense metropolitan areas (Siegnier, Sowerwine, & Acey, 2018; Pallana, 2014). The vast majority of urban agricultural operations and organizations are cultivating public agency lands they do not own, but instead some have a land use agreement, when possible, and others operate on sites based on social relationships and informal agreements.

Trends for commercial scale agricultural land in Alameda County show a decrease from 253,386 acres in 2006 to 250,717 acres in 2012 (California Department of Conservation, 2008), with similar trends across the San Francisco Bay Area. Recently, there has been a loss of 880 acres from 2010-2012 (California Department of Conservation, 2015). The increasing costs of Bay Area living, and construction of more housing developments are the main influences for land use change in cities that is increasing across all Bay Area counties. For private urban lands, significant increases in land values in the Bay Area Counties in 2009-2019 impacted land access for residential yard cultivation. Home values drastically increased; median sales prices of single-family homes in Alameda County increased by 239% from 2009 to 2019 from \$381 to \$910 thousand dollars. In Contra Costa County, sales prices increased by 251% from \$263 to \$660, in Santa Clara sales price increased by 239% from \$525 thousand to \$1.3 million, and in San Francisco, sales prices increased by 214% from \$741 thousand to \$1.6 million (Policy Map, 2019). To improve long-term viability and overall success, it is important to enhance urban farmers' capability for increased economic efficiency through improved resource management, operational costs reductions and diversified revenue streams.

Urban land use policies for urban agriculture are often outdated and lack a basic definition for agricultural activity that is flexible and adaptive based on type, scale, intensity and extent of agricultural land use and how such activities could be supported (Bennaton, 2019). Even when policy is aligned to improve environmental health and food security, insufficient understanding of realities on the ground, lack of funding or oversight can limit achieving its goals. The California Senate Bill SB-1383 (2016) is an example of policy that has an ambitious goal of reducing methane emissions from dairy livestock and organic waste going into landfills, aiming at reducing statewide organic waste 50% by 2020 and 75% by 2025. But, whether the costs of compost distribution will offset the burdens they may cause is still being worked out. Byproducts of this legislative policy may include more edible food recovery, and increasing local compost production that can support urban food growers. Examples of urban agricultural policy that meets local immediate needs and prioritizes urban residents' access and capacity to engage in opportunities for building the micro-farm to fork pipeline include the Community Food Production Act (AB 1990), California Cottage Food Act (AB 1616), and Microenterprise Home Kitchen Operations (AB 626). Through participation on the Oakland Food Policy Council, the Eden Area Food Alliance, the Contra Costa, San Mateo and Santa Clara Food Systems Alliance, efforts were made to connect stakeholders, share participatory research opportunities and policy information that supported local urban growers and food system policy development stakeholders.

METHODOLOGY

Clientele

Urban agriculture and food systems stakeholders were defined based on the above, through various educational and research projects, programs and informal dialogues over 5 years, and included:

- The urban food growing community made up county residents in many roles: community-based food security-oriented individuals and organizations, for profit food producers and community food growers, urban or regional food policy councils and food systems alliances, faith based urban farming and food access groups and coalitions, community-based educators, youth development leaders and senior program staff.

Volunteers and staff in food security, food access, food policy and emergency food provision organizations.

- County Agriculture Commissioners, and Environmental Health Dept., City and County Planning, Public Health, Social Service, Sustainability Unit, Conservation Officers and Resource Conservation Districts Directors, Supervisors and staff and local County Supervisors, City Council representatives and their staff, and Community College academics all contributed.
- The above categories are not necessarily mutually exclusive and, in fact, have a high degree of overlap. The broader population beginning to become active in small-scale food growing is also a part of the clients, as are micro-farm to fork entrepreneurs.

Data collection

The first component of the needs assessments research was on urban soil quality and resulting samples analysis of 14 urban farming operations, as well as reporting done by and with partner groups. Other work done was the administration of over 5 years of the Alameda County Resource Conservation District (ACRCD) - UCCE Urban Ag MiniGrant Program, which collected impacts-reports funded through this partnership. Methods assessing urban farmers' experience-based needs were informal surveys and evaluative assessments from multiple different sets of series-based workshops offered via funding from USDA Beginning Farmer & Rancher Development Program (BFRDP) Grant and a UCANR grant. More qualitative data was collected via four Urban Farm Mapped Group Review Process Meetings in 2018 and one culminating meeting in 2019, with support from Alameda County and the University of California Agriculture and Natural Resources' Information and Geographic Informatics Systems unit (ANR IGIS). Finally, further needs were determined through two other ongoing special projects entitled: Food Safety Needs Assessment for Specialty Crop Gleaning Organizations in California, and the other is the Produce Safety After a Wildfire project with regional ANR colleagues and partners in the North Bay.

Prior outstanding work that assessed food systems needs in Oakland included A Food Systems Assessment For Oakland, CA: Toward a Sustainable Food Plan, the Santa Clara County A Food Systems Assessment, the San Mateo County Food Systems Assessment, Richmond's Food Systems Assessment, San Francisco's Food Systems Assessment, and many, many more.

Thus, in developing UCCE's Bay Area urban Ag & Food Systems Needs Assessment, the question became why so many resources should be put into assessing the needs versus addressing them with educational research and extension program.

RESULTS

Soils sampling & analysis (14 urban farms) (2014) & Garlic Bulbs Project (2020)

Research conducted in Oakland by Nathan McClintock in Cultivating the Commons in 2010, found that all 114 sites he sampled had some lead in samples tested (McClintock & Cooper, 2010). Of the 114 sites sampled, 47 were found to have medium to above threshold levels of lead concentrations. Hence, soil quality is one major characteristic for considering the potential for cities like Oakland, with highly diverse, often low-income populations to consider food growing potentials on vacant public lands. To continue assessing potential food growing capacity, Bennaton and Sheila Golden of UCCE Alameda conducted soil sampling and obtained lab test results for 14 sites in 2014. One sample had a very high level of lead found and is part of a historic homestead site in East Oakland. Results were shared with constituents, and best practices were more heavily followed moving forward, given that lead was present, but exposure pathways could still be minimized.

A second project completed in 2020 analyzed at least 5 samples of garlic bulbs grown at 3 East Oakland urban farm sites and one Berkeley site as an informal research project. The Berkeley site is a faith-based site, and there, the bulbs were grown in raised planter boxes with imported soils in an area of good air quality and minimal industrial contributions to local overall particulate matter. For purposes of this simple experimental design, the Berkeley site served as a controlled sampled site, where minimal to no heavy metals in soils where garlic bulbs were grown, was expected. Because urban soil quality variability is so high across land areas, always following safe practices and assuming potential for contaminant levels at or near thresholds is a good rule of thumb. Growing in tested soils with results below federal Environmental Protection Agency (EPA) or Cal EPA thresholds are key ways to stay safe in urban produce cultivation, harvesting and consumption. Wind-blown soil dust on produce can be a potential cause for food safety concerns.

Oakland/East Bay: food access and racial equity

Many community-based organizations, volunteer-based groups in low-income areas of Oakland voiced need for fresh produce in their neighborhood(s) as did many of institutions that serve Oakland residents, including the Oakland Unified Schools District (Unger & Wooten, 2006). There have been multiple projects that have looked at the food access and racial equity needs in Oakland (Pallana, E., 2014; Center for Social Inclusion, 2014; McClintock & Cooper, 2010; Unger & Wooten, 2006). One of the needs that was identified was for a central kitchen to be developed, planned and built to serve Oakland Unified School District (OUSD) (Center for Social Inclusion, 2014; Central Kitchen, 2015), finally in process of completion in 2019/2020. There was a map sketched out and Census Tract Data from 2014 and 2010 were used to collect data from 279 households. Youth were included in the survey collecting efforts. Another method for filling out surveys was through emails sent to Councilmembers and to City Council to fill out and share to neighborhood organizations.

Alameda County Resource Conservation District - UCCE Urban Ag Program partnership

Since 2015, the ACRCRD has partnered with UCCE Urban Ag Program to administer the Urban Ag Mini-Grants Program for funding small soil, water and habitat - quality best management practices implementation by urban farming groups in Alameda County. The goal was for small grants, ranging between \$3-5,000, to help improve habitat ecology and natural resource conservation on urban farms to enhance water and soil quality. The parameters for what the money was spent on was based on the urban farms needs and projects. Funding was administered from 2015-2019. The program was formed for urban farmers to easily apply and administer funding of grants of up to \$3,000 to improve habitat ecology and resource conservation on urban farms to enhance water and soil quality. Groups that received funds were asked to keep a record of plants planted, water diverted, swale/berms, compost, mulch, erosion prevented, signage installed, volunteers trained, education efforts, events and additional food production measured. Data on impacts and benefits of grants funded were compiled from records of each group and separated into each funding year to produce an overall impact report. This partnership between the Alameda County Resource Conservation District and UCCE's Urban Ag and Food Systems Program increased efficiencies in urban food growing by conserving natural resources and reducing costs through a small grant program developed to replicate the USDA EQIP Grants Program at small scale for urban growers. All organizations reported increased educational event outreach, often increasing repeat volunteer returnees, and overall conservation of California's natural resources. This project partnership has funded \$104,276 through 2022 in small grants, with an average of total funds awarded being around \$16,000 per year.

Surveys and evaluations from workshops

1. USDA Beginning Farmer & Rancher Development Program (BFRDP) grant-funded

workshops.

The BFRDP was a collaboration between UC Berkeley, UC Cooperative Extension, NCAT/ATTRA, Alameda Resource Conservation District (ACRCD). The goals of this project were to provide training and technical assistance that was culturally appropriate to beginner farmers and ranchers as well as to work closely with small and immigrant farmers to develop regional relevant educational material, support agricultural learning hubs and to evolve program efforts according to farmers changing needs (Sowerwine, Bui & Getz 2014). Workshops were offered in Alameda, Contra Costa, Solano, Sonoma and Santa Clara Counties to urban farmers and some small produce - backyard food growers. Topics covered in the workshops were the following, in order of largest focus to lowest, Business Planning & Marketing, Ecological Farming, Urban Agriculture Soil Quality, Value-Added Processing, Pasture/Rangeland Farming, Food Safety, Collaborative Farming. Overall, the whole BFRDP project had 2,018 participants that attended 141 educational workshops. In the BFRDP project, Bennaton provided workshops and presentations on urban soil quality, food safety practices and edible landscaping. Five workshops were held in Summer, 2016, and 14 were held in the Fall of 2016.

2. UCANR-funded urban ag workshops on production issues, business planning, marketing and management, food safety and legal basics such as zoning, permitting and land access.

Led by Rachel Surls and Rob Bennaton, the UCANR Urban Ag Collaborative Team and partners developed this project titled: Building Success in California's Urban Agriculture: Managing Risk and Leveraging Opportunities, as a four workshop module series, administered in four of California's largest regions. The modules included 1) Urban Farming Legal Basics, 2) Marketing and Business Management for Urban Farms 3) Production Considerations for Urban Farms and 4) Pre- and Post-Harvest Food Safety for Urban Farms (Surls & Bennaton, 2018). The theme across all topics was risk management, and ways for profit, non-profit and community volunteer-based groups could reduce risk and improve long term economic viability and land tenure over time.

Post-workshops surveys were completed after attendees participated in sixteen 2017-18 UCANR-funded Urban Ag Workshops held in the Bay Area, L.A. Sacramento and San Diego for the project. Workshop topics included aspects of farm production like irrigation, organic matter and urban soil quality management, water, poultry and pest management. Other topics included issues like zoning, permits, city water access, regulations, cottage food, on farm food safety, marketing and business planning and management. These extensive workshops included 581 participants, and highlighted specific urban farm groups'/sites as workshop components, including field tours for food safety, and production management practices demonstrated onsite. Each workshop included pre- and post- evaluations rating levels of knowledge gained from 1 to 5. Online post-workshop surveys were sent 2-4 months after participation with questions on usefulness of workshops, demographics and open-ended questions (Surls & Bennaton, 2018).

3. Mapped group review process and evaluative assessment surveys.

The UCCE Alameda Urban Ag Mapping Project is intended to create an accessible online urban agriculture map for use by and for the benefit of urban food growers, and the public/urban agricultural enthusiasts. The project includes a diverse array of project partners, particularly urban food growers, to lead concept development, pilot and promote the map initially with Alameda County, then, beyond, and encourage partners and major stakeholders to adopt it into their web platforms. In June 2018, over 60 participants self-identified as urban farmers/community gardeners, County residents and/or food system leaders, participated in meetings for the 4-Mapped Group Review Process. Meeting goals were as follows:

- To gather and engage urban food growers in conversation for seeking feedback/input regarding the beta version of the map, as a calibration exercise to determine what other map attributes the map should have that are relevant to Bay Area urban food growers.

- To participate in a collective critique of sample maps as a way to consider the urban ag map as a community tool and future food-web and resilience-building-resource.
- To convene local growers / resources to build collective work and foster cooperative food growing, as well as urban-rural partnerships and hyper-local food access, via agency/organization-resource shares. (Cooperative Extension-Alameda County, 2018)

Participants were provided a brief overview of the map project goals, engaged in community conversations using specific questions to determine the map's usability/utility and overall purpose as well as previewing and providing critical feedback on currently used food system maps from across the country. Participants also engaged in a series of "lightning" resource shares with a variety of governmental and nonprofit resource-partners to build local capacity and agency with respect to city farming and food growing. This networking opportunity resulted in relationships and collaborations that expanded from this initial meeting. These conversations with public/governmental agencies prove to be integral to urban agriculture due to barriers in private land access. Participants were asked about the mechanics and functioning of the map. This included asking about first impressions, any notable map traits and functions that were preferred, or not. They were also encouraged to give input on what they would like to add or change to existing map types (Ford, N., Bennaton, R., 2018).

Data from meetings with participants.

- Twenty-three (23%) percent of participants self-reported as farmers and/or gardeners, Seventeen (17%) percent as Directors and others self-reported as staff members, community members, local food champions and resource partners.
- Fifty-two (52%) percent of participants have been involved in food systems and/or farming/gardening work for ten years or more; Twenty-five (25) percent have been involved in food systems for 5-10 years and the rest have been involved for five years or less.

Session Experience:

- Ninety-Three (93%) percent agreed that the meeting was well facilitated.
- Seventy-Eight (78%) percent were familiar with the mapping project.
- Ninety-Two (92%) percent commented that the goals of the mapping project are clear.

Features Most Beneficial:

- Demographics and information (43 %)
- Programming and Services (68.6 %)
- Lead contact information (68%)
- Mission and vision statements (47%)
- Other items: Produce available, environment information, production, volunteer and/or involvement opportunities, cost of produce, resource exchange.
- UC-Cooperative Extension Support-Requested: providing technical support, organizing meetings to bring food system leaders together, improving access to research and other opportunities, etc.

4. Food safety for gleaners focus groups research.

The Specialty Crops Research Initiative Grant-funded Food Safety Needs Assessment for Specialty Crop Gleaning Organizations in California project held 2 focus group meetings each in Alameda, Sonoma and Los Angeles. One focus group was with Emergency Food Providers, and the other was with Produce Gleaners, with both assessing needs around food safety practices conducted by each group and needs on food safety related to catered and gleaned foods recovered. Compilation, evaluation and analysis of project results are ongoing, and will be dove-tailed with similarly structured focus groups meetings with Agricultural Commissioners/Environmental Health regulators in 2021-22. Some preliminary results suggest larger scale emergency food providers conduct more food safety practices than predicted, while produce gleaners are more

likely to be redirected back to local food pantries, rather than receipt by larger distribution networks such as Countywide food banks. All expressed open interest in ongoing educational training opportunities in food safety, and additional fact sheets in multiple languages on the topic were also considered helpful, when translated. This project resulted in the following publication [A preliminary assessment of food policy obstacles in California's produce recovery networks.](#)

5. Produce food safety after natural disasters/urban fires and floods.

A growing area of specialization based on demand and need is research and educational programs around produce safety after floods and fires, where contaminants have the potential to be deposited via air and water, potentially adsorbing to soils and sometimes being potentially up-taken by produce. Both the San Jose River floods in 2016, and the 2017 wildfires in the North Bay regions led to civic science efforts around soils testing, and contaminant exposure prevention through best practices implementation. In both cases, Master Gardener volunteers were engaged in soils and/or produced sample data collection, and the results were obtained through a collaborative effort with partner groups, including local nonprofits and government agencies. More than 15 volunteers participated at more than 25 sites collecting 200+ samples. This research project included three phases.

Phase I: Our preliminary analysis tested samples from two high-priority sites that were most likely to have received deposits of toxic chemicals from combustion of residential and urban structures. The team provided two varieties of leafy greens (kale, lettuce) from the two sites to TestAmerica in Sacramento for analysis for PAHs, CAM17 metals, and dioxins and furans. Based on these preliminary findings, we hypothesized that produce safety was not significantly affected by the fires and that heavy metal deposits may be mitigated by washing produce.

Phase 2: We selected three sites for additional testing based on three variables: distance from urban burn area, ranking on meteorological deposition model used in preliminary analysis, and ranking on particulate matter levels during fire. For these three sites, we sent washed and unwashed kale samples to Enthalpy Analytical to be tested for Polychlorinated Biphenyls, Dioxins and Furans, and Heavy Metals. We selected an additional, fourth, site to send in washed and unwashed kale samples to test for Polycyclic Aromatic Hydrocarbons.

Phase 3: In addition to examining each chemical in each route of exposure, our study uses a cumulative approach to examine the total set of exposures that could impact health, including an assessment of chemical mixtures, a risk-benefit analysis of ingesting smoke-exposed produce and a literature review of social determinants of health considerations in wildfire health impacts. Our mixed-methods analysis evaluates health hazards and protective factors. Our conclusions draw from the synthesis of these traditional risk assessment and holistic methods (Bennaton et al., 2019).

Response/feedback gathered from urban ag meetings and projects

1. Informal one on one consultations, meetings and interviews.

The majority of assessment meetings and interviews occurred as informal one on one interviews on urban farm sites with important farm managers, individuals leading volunteers, or executive directors for nonprofit organizations. In many cases, they were the founder of the organization as well and/or individuals who worked directly with them. Most of the groups that Urban Ag Advisor Bennaton engaged with are identified in the current edition of the Bay Area Urban Farming Resource Guide produced by the UCCE Bay Area Urban Ag Advisor, and Urban Ag Program staff.

2. Urban Adamah-UCCE - NorCal Resilience Network urban ag food web meeting, November 19, 2019.

The 1st Urban Farmer Networking Dinner took place on November 5th at Urban Adamah in Berkeley. Multiple Bay Area organizations and urban ag academics were invited. Organizations who

participated included the UC Gill Tract Community Farm, Common Vision, school garden educators and farmers from Bishop O'Dowd High School, representatives from Alameda County Ag Advisory Committee, several School Garden Program volunteers of the Alameda County Master Gardener Program, Interfaith Sustainable Food Collaborative, Pollinate Farm & Garden Supply's store owner and many more. Attendees were invited to network and discuss further collaboration, sharing resources through a web-portal, and ease of communication among urban farmers. The event was hosted by Debbie Harris, Farm Director at Urban Adamah, Alana Siegner, UC Berkeley ESPM Doctoral student at the time and Rob Bennaton, UCCE. Part of what came from this meeting was stakeholder voicing of needs around event outreach and resource sharing across the urban farming network, which could also expand peer to peer learning opportunities regionally.

Urban agriculture and resilience network development

From that meeting sprang the Urban Ag and Resilience Network Development which seeks to create greater connectivity and resource sharing amongst Bay Area urban farmers. Methods for collecting information for this urban agriculture network is composed of in person, phone and email conversation amongst 6 colleagues, Jennifer Sowerwine the Assistant Cooperative Extension Specialist, Debbie Harris the Urban Adamah Farm Director, Susan Silber, NorCal Resilience Network, Alana Siegner, Ph.D. student at UC Berkeley (Energy and Resources Group) and Charisma Acey (Department of City and Regional Planning, UC Berkeley). These individuals all have years of experience with urban agriculture.

1. Strengths and limitations.

Strengths included a lot of support from key participants often with years of experience, so the programming of workshops, meetings and surveys/evaluation was effective and organized. The quality of data collected was good with reasonable responses and helpful comments. Most participants were native English speakers and were open to working with large organizations, agencies and institutions, and having future evaluations be more inclusive of non-English speakers.

Limitations included possible language barriers because the surveys were predominantly in English (with a few in Spanish). A large percentage of workshop attendees, 62% were White/Caucasian, mostly women, so there might have been a barrier or lack of awareness of services to immigrant or more isolated low-income communities of color, though this is also caused by insufficient money for staff time to complete such needed outreach. The point was made early on that, in the Bay Area, if the workshops were held on Saturdays, attendance may have been much higher. A large reason for this is because working class communities have limited time and capacity. An ongoing goal for scaling up is to improve outreach and support to low-income immigrant communities who usually have knowledge and experience in subsistence agriculture but face systematic barriers that limit their access to land, resources and capacity to participate in urban ag/farming.

2. Supportive inter- and intra-agency participants and collaborators.

Individuals who helped administer, participated or lent support in the process.

Agency Partners: Ag Commissioners Humberto Izquierdo, Scott Paulsen, Cathy Roache

Environmental Health Officers: Jackie Greenwood, Ron Browder

USDA NRCS: Alyson Aquino, Hilary Phillips, Katie Bergman, Victor Hernandez

ACRCD: Susan Ellsworth (ex-officio), Hillary Sardinias, Stephanie Lew, Anandi Gandhi

Hayward Area Recreation District: Rick Hatcher, Minane Jameson, Paul McCreary, Paul Hodges

East Bay Regional Parks District: Ellen Corbett, Dennis Waespi

Sustainable Economies Law Center: Christina Oatfield, Neil Thapar, Janelle Orsi, Yassi Eskandari

CAFF: Paul Towers

CAFFC: Peter Ruddock, Melanie Wong, May Patino

Other supportive community-non-profit, business and/or volunteer groups.

City Slicker Farms, Phat Beets Produce, IRC New Roots Program, Mo' Betta Foods, UC Gill Tract Community Farm, Ashby Community Garden, CoCo Sustainable Farm, Urban Tilth, Rodgers Ranch, Common Vision, Fremont Leaf, Fertile Groundworks, Crosswinds Church, Interfaith Sustainable Food Collaborative, Berkeley Community Garden Collaborative (several groups), Mesa, Alameda County Ag Advisory Task Force, Co-Garden, We Run Food, Eden Area Urban Farms, Joe's Honey, Bancroft Community Garden, O2 Artisans Aggregate, New Hope and Love Temple Baptist Churches, Pollinate Farm & garden Supply and many, many more.

UCANR staff, former Staff or volunteers.

Sheila Golden, Reyna Yagi, Rachel Surls, Andy Lyons, Penny Leff, Julia Van Soelen Kim, Ryan Duncans, Jessica Schweiger, Jennifer Sowerwine, Erin DiCaprio, Sabine Dabady, Nicodemus Ford, Julio Contreras, Maurice Pitesky, Todd Kelman, Mimi Enright, Suzi Grady, Vanessa Raditz, Terry Lyngso, Maria Valenzuela, Madeleine Tucker.

Contributors to processing and analyses of the data.

Rachel Surls, Reyna Yagi, Jennifer Sowerwine, Julia Van Soelen Kim, Penny Leff, Nicodemus Ford, Sabine Dabady, Alda Pires, Julio Contreras

RESULTS

Soils sampling and analysis - urban farm sites

Bennaton and Sheila Golden of UCCE Alameda conducted soil sampling and obtained lab test results for 14 sites and found only one with above threshold levels. However, more testing is needed, given that urban soils and particularly soils in highly industrialized areas tend to have high degrees of variable soil quality even across small land area open spaces (Cornell Waste Management Institute, 2015; Surls, Borel & Biscaro, 2013). Also, some research from Cornell suggests that just because soils have heavy metals does not precisely mean that all crops grown in them will concentrate them in their plant tissues, and the results are based on a number of factors, including sites histories, contaminant types, crops grown (Cornell CALS, 2020; Paltseva, 2019). Given ingestion is a major pathway for exposure, ongoing education and enhanced awareness plus implemented best practices are the priority pathways for exposure prevention, and practical educational opportunities centered on these are needed on an on-going basis (Paltseva, 2019).

In 2019-2020, a subsequent follow-up project that developed from this urban soil quality needs assessment considered soil contaminants up-taken into vegetable crops' vegetative plant tissues. An innovative approach Bennaton assessed was whether heavy metals-concentrations accumulated in grown garlic bulbs, which were analyzed by Enthalpy Analytical Lab a commercial analytical lab. The project was conducted at sites where soil testing was done in 2014, and vegetative tissue sampling of 5 garlic bulbs per site, with their bulb tissues tested for heavy metals concentrations including lead, arsenic and cadmium, among others, found no significant contaminant uptake. Future funding is still being sought for ongoing projects beyond a very small sample set from garlic harvested in Spring, 2020.

Oakland: food access and racial equity

The extensive work of Unger & Wooten in 2006, A Food Systems Assessment for Oakland, CA: Toward a Sustainable Food Plan, has multiple findings of food security challenges that Oakland residents face. These include a lack of healthy retail stores, a prevalence of liquor and junk food stores, a lack of fresh produce availability in low-income parts of Oakland, primarily East and West, a lack of food growing spaces, disproportionately unequal local economic development investment, and minimally present government, city, industry and markets evident in the lack of transportation, stores, supermarket and health care support.

Specifically in Oakland, more than 16% of residents were food insecure, then, almost half (42%) of school-aged youth are overweight or obese (Babey et al. 2012). Although many urban farms and gardens existed in 2006, there is still no uniform procedure in place for acquiring access to vacant or underutilized land and urban agriculture is often hindered by existing land use rules and policies (Pallana, 2014; McClintock & Cooper, 2010). The Oakland Food Policy Council, thus, prioritized addressing policy influencing allowance of limiting urban agriculture at the time in order to allow the community to expand food production and improve Oakland's local food system.

The results were a total of 340 responses, 284 being from the targeted community. There were a total of 65 individuals emailed with a survey link but only with 19 online responses. The demographics section got a total of 261 respondents with 30% of them responding that they were unemployed, this was besides the 8% reporting as retired and 3% as disabled. Oakland's Citywide unemployment rate was 5.5%. More than half (62%) of respondents had lived in Oakland for more than 10 years with 42% actually living in their specific neighborhood for more than 10 years. 87% of the respondents stated that they feel that the Rethinking School Lunch Oakland was a good program, with many benefits for school children. 70% of the respondents expressed that they were excited about the Central Kitchen, Instructional Farm, and Education Center coming into their neighborhood. Over three fifths (69%) of respondents stated that they had no concerns about the project's impact on their neighborhood, and 31% of respondents provided input about their concerns of noise, traffic, gentrification, industrial use and the displacing of current students.

Burdened renters and homeowners in the city of Oakland:

- In 2015-2019, 49% of renters in Oakland were burdened (paid over 30% of their income towards rent), in 2005-2009, 52% of renters were burdened. In 2015-2019, 33% of homeowners were burdened, in 2005-2009, 48% of homeowners were burdened (Source: www.policymap.com).

Burdened renters and homeowners in Alameda County:

- In 2015-2019, 48% of renters in Alameda County were burdened (paid over 30% of their income towards mortgage), in 2005-2009, 48% of renters in Alameda County were burdened.

In 2015-2019, 28% of homeowners in Alameda County were burdened, in 2005-2009 43% of homeowners in Alameda County were burdened (Source: www.policymap.com).

In this socio-economic context, the UCCE Urban Ag & Food Systems Program is seeking to serve, operate and grow with its participants in seeking to help meet their identified or emerging needs.

Alameda County Resource Conservation District (ACRCD) - UCCE urban ag program partnership

This project partnership funded \$96,776 in small grants averaging \$2,800-3,000, with an average of total funds awarded being around \$16,000 per year (ACRCD, 2020). The project has grown tremendously in popularity, with more applicants in 2019 than ever before; in 2018, the RCD funded a part time UCCE Community Education Specialist to conduct more closely managed and tracked outreach, and the collaboration always supports low income and diverse food growers.

In 2015, grants provided to WOW, Phat Beets and IRC together totaling \$8,615, saved 4,300 gallons per year and helped the latter two organizations fund 5 public events (Summary of Impact Reports Year 1 2015, not publicly available). The funds provided in 2016 helped organizations create new compost system that prevented over 1,820 lb. of fertilizer from being bought and used, helped with 2 rainwater capture projects that collected 3,550 gallons, gray water sink installation that reused 137, 268 gallons and that prevented 17, 500 gallons of water being used. (Summary of Impact Reports Year3_2016). Total groups that were funded included 9 projects in 2019, 8 in 2018, 6 in 2017, 14 in 2016 and 10 in 2015, with funds availability varying from Alameda County by year.

USDA Beginning Farmer & Rancher Development Project grant-funded workshops

There were multiple key outcomes from this large scope project intended to support both rural and urban farmers. The BFR increased networking access to resources, assistance and farmland through community and networking events reached 3,508 individuals. Information gathered from surveys sent out after the workshop included farm success of at least 921 unique farmers and ranchers, 44% implemented new production practices within 6 months. 87% of workshop participants learned new best practices and of all participants, demographics included 55% women and 36% minorities/socially disadvantaged farmers. We assisted 14 farmers with actually accessing land and starting to farm. The project helped develop and/or provided support to 4 new agriculture learning hubs in the East Bay Area. Of all the workshops, Bennaton taught a total of five workshops in Spring/ Summer, and 14 in Fall of 2017. There were 100% of participants from four of five 2016 workshops that reported starting/implementing urban soils best management practices learned in 6-month post-workshop evaluation-surveys (Sowerwine, Bui & Getz 2014).

UCANR-funded urban ag workshops on production, business planning, marketing and management, food safety and legal basics such as zoning, permitting and lands access

Each of the 16 workshops had participants reporting significant increases in knowledge. For example, post evaluations participants learned about policy and laws impacting urban agriculture in legal basics workshops. There was significant improvement in understanding AB551/465 (Urban Agriculture Incentive Zones, as well as the Neighborhood Food Act). These workshops also connected participants with County Agricultural Commissioners, Planning Departments, and Environmental Health Department staff.

For the farm production workshops, there was an improvement in understanding application of soil fertility and integrated pest management practices. Online post-workshop surveys were sent 2-4 months after participation with a total of 90 respondents. Respondents said workshops they attended were either extremely useful (56%) or useful (37%). More than half (67%) were farming and 44% had less than 10 years of farming experience. Ethnicity ratios included more than half (62%) White/Caucasian, 21% identified as Hispanic/Latino, 8% as Asian/Pacific Islander, 8% as Black/African American and 6% as Native American. More than half (60%) identified as female and age proportions (42%) identified as 25-40 years of age. The survey asked open-ended questions like "What are the most important challenges you face as an urban farmer?" Almost 60% responded that challenges around the economics of urban farming, including issues such as costs, pricing, marketing, and access to capital were the largest issues faced. Finding and securing appropriate land, and/or their land tenure were the next main concern for 34% of respondents. Twenty-six also noted that there is a lack of networking opportunities for urban farmers, and that is one area UCCE could play a central role, with the workshops astoundingly serving that function of cultivating food grower-network links.

2018-19 mapped group review process and evaluative assessment surveys and meetings

Five Mapped Group Review Process Meetings were held, 4 in 2018 and one in 2019 in the four major sections of Alameda County to gather participatory survey-input on what the most important and needed map attributes on the UCCE Urban Ag Map within the NeighborFood Webpage should be. The ultimate goal of the urban ag mapping platform is supporting urban farm viability and farm site-open space preservation, with a particular lens to providing access to food and land for low income, often multicultural urban food growers with lots of agrarian knowledge, and limited English proficiency. The surveys gauged map-users'-interests as to how the map can serve them, but, a more plural approach must be taken with non-English speakers, and that will take time to implement and funds to staff such efforts.

One comment frequently made during multiple meeting sessions, and with individual urban farmers during farm visits, was creating a portal for groups to announce requests for needed resources and offer tools, seeds, produce and other urban ag items to share. Another aspect focused on was sharing events so as to improve outreach to more local participants and/or recruit more

local volunteers, plus potential to coordinate workdays across sites. The presentation on the map also assisted in opening conversations on land access needs per long term site viability in terms of land tenure, plus different site-governance models that exist in other parts of the U.S.

The main findings of the mapping meetings were that the map as a whole provided the large scope of the urban ag projects in the Bay Area. When farms “get on the map,” they build collective and online awareness among the public, and greater access to resources by facilitating connection with other people or groups. The web page and map will serve as a central juncture for access to resources and information on supply and demand of resources like compost, seedlings, fruit tree scions, free greenhouse space or transplant-tray soils, volunteers, grants, toll lending, etc. The map will help as a visualization of the local food systems, food production, food access to needed communities by building a network of growers, processors and urban ag enthusiasts. The map meetings have spurred the need for a central platform that can connect the network with resources and information, and for information about events, community organizing, providing social connections in the process; the map can be a space for the sharing of experiences, knowledge, stories and ideas moving forward (Ford, N., Bennaton, R., 2018).

1. Map benefits.

Increased collaboration and resource sharing.

Strategic points to cultivate collaborative practices, potential to create food hubs, especially to support food insecure areas, distribute seeds/seed sharing, focus on resources as a primary driver of the map, links farms and communities with surplus and particular needs, and volunteer and educational programming, distribute produce, improve small operations to build network, distribute excess produce, build relationships and capacity, collective growing and distribution practices and increase overall connectedness and partnerships.

Improve food access and knowledge for communities.

Public can put what they would like to see grown at different sites, can be a celebrator of culture, public agencies can better identify needs and support, helpful to highlight and pinpoint groups, growing food by other ethnic groups, strategic points to cultivate encouraging collaborative practices.

Maximize individual and collective impact to shape local, regional and state policy.

Map can double as an urban ag census for the county, can support driving of funds and resource allocation, can be a pulse-taker on urban ag lands-use policies for community feedback on ways to improve them.

2. Map challenges/issues.

Privacy and reporting.

Be mindful that gardens can be used as tools for gentrification (“how can we influence development without displacement?”), fear that a map will shift knowledge of a place from a local neighborhood community to a greater group of outsiders, potential to anonymize location, create a clear system of verification, other concerns around human/food safety and information sharing, many may be farming/gardening without permits, unpermitted spaces still have value to the community.

Defining the audience and purpose for the map.

Linguistic limitations for internet platforms, ensuring the map is culturally relevant and accessible, a tool is only as good as it is useful, defining farms and community gardens are a need and what kinds of farms/community spaces to be included are essential.

Regular updating and providing relevant, and recent information.

Youth can possibly be hired to do this work, which requires a more robust plan and strategic approach. UCANR is unable to fund this work without additional grant awards.

Food safety for produce gleaners focus groups research

Qualitative data from this project is rich with details on practices followed, and it is still being analyzed. One key finding is that many of the larger food banks such as Alameda County's Community Food Bank will not accept gleaned produce but refers gleaners to drop off produce directly with small-scale emergency food providers, who are often proximally closer. In most cases, this pathway is a redirection from local source to local distributor that the larger, regional food banks already distribute to. If funded, phase 2 of the research will include pathogenic and heavy metals-contaminants screening of produce for comparison to each focus groups' needs and food safety practices followed to determine actual risk from recovered foods. These preliminary results are based on an initial review of qualitative focus group meeting discussions.

The 3rd set of meetings will be conducted primarily as phone interviews in which Environmental Health regulators will be surveyed on their food safety needs for practices that food recovery groups should be following to ensure food safety. The project aims to ensure that where food safety needs such as best practices are being followed, or needs are not being met, and where regulators may be over extrapolating risk, that sound, scientific data-based fact sheets and training opportunities be developed in response to those needs.

Produce food safety after natural disasters

Output from these projects include the Gardening After the Flood publication with UCCE Santa Clara that is in peer review now, and the project Toolkit, including the facts-sheet, reports, PowerPoint and webinar/video for the Produce Safety After a Wildfire project in the North Bay. Additionally, work with the San Mateo Master Gardener Program volunteers has led to their development of a series of soils workshops, and the cultivation of a cadre of Master Gardeners who focus on soils education. This team approach around developing the presentations is a replicable option in other counties where urban soil quality is less than optimal on urban farms-sites, or due to disasters like fires or floods. Where local industry has contributed to such cases, thus making food growing harder, upstream contributors to contaminant exposure must consider better and different building materials and pathways to prevent contaminants' deposition in floods and fires.

Results from all three phases found that there was low concern of produce contamination. Produced samples did not have detectable PCBs and also no detectable Dioxins and Furans in 12/13 samples. Also, there weren't any detectable Proposition 65 regulated heavy metals in 12/13 samples. None had detectable levels of lead, arsenic, mercury or chromium. There was only 1 sample out of 19 that contained nickel levels that if eaten daily, exceed Prop 65 NSRL.

The soils analytical-results- summary also demonstrated low concern per samples tested, but, there is recommendation to do more soil testing in Santa Rosa. The sites closest to Santa Rosa had the highest levels of dioxins and furans that exceed EPA and OEHHA soil screening levels, however, due to testing only occurring after the fire it isn't possible to determine if these levels existed beforehand or were solely smoke-deposited. Overall, in Sonoma County, the heavy metal concentrations were below post fire cleanup goals and there were no detectable PCBs. It was concluded that the main concern with soil dioxin contamination is from direct inhalation and ingestion of soil, mainly concerned with children. Short-term preventative methods include avoiding direct contact with soil, washing hands and produce. Long-term best practices are to heavily amend soil with compost, to mulch and use drip irrigation in order to avoid soil and dust up-splash onto the undersides of crops' leaves when watering with sprinklers or handheld hoses (Bennaton et al., 2018).

Urban Adamah-UCCE-NorCal Resilience Network urban ag food web meeting, November 19, 2019

The November 2019 meeting was influenced by participant demographics of the aggregate of individuals and groups represented, each giving input and interested in further collaborations. This meeting served as a source for individuals to announce their organization and projects and events as well as a reunion of some organizations that had previously worked together. This introduction and announcement phase directly resulted in two new volunteers for Common Vision who helped plant over 30 trees in the Contra Costa School District. There were also other further collaborations and awareness building of information, organizations and overall increase of social capital for most attendees. At the end of the meeting, there was a 30-minute unplanned but naturally flowing period of individuals linking up, exchanging contact information and discussing future collaborations, plus resources they had to share, and unmet needs they needed help with.

Urban ag and resilience network development

From the above set of meetings, the collective group intends to work with UCCE and NorCal Resilience Network to create a central platform to connect organizations, resources and services, in a simple and user-friendly platform that connects Bay Area urban agriculture projects and goals (Harris, 2019-2020). Urban agriculture efforts, when taken together in the Bay Area, represent an example of a network of hubs and their branches, and direct access to an online platform can offer people access to urban farming in different ways not seen prior (Harris, 2019-2020). Sowerwine proposed the following overview questions that guide the goal of the Urban Ag and Resilience Network Development; What networks exist? What's the best way of consolidating them? What do you like about them, what are their shortcomings? Important values of the forums are informal networking, relationship building, and time set aside for informal discussions.

The Executive Director for North Cal Resilience Network (NCRN) offered the idea that NCRN could provide the platform for the website which would include aspects like jobs, an events calendar, ask-a-farmer, resource sharing, soft skills around racial justice, conflict resolution and workshops opportunities. Also included would be the redistribution of resources to urban farms, up to date grants, interfaith food-based efforts, UC Berkeley collaborations, focus group on resilience and healing (Grady, 2019-2020). Dr. Charisma Acey of the UC Berkeley Urban Planning Dept. contributed by inquiring about the network's food system components and about how to identify urban agriculture farmers. Susan Silber of the NCRN provided information from various online platforms that organize a website and services such as Might Network, Engagement Communities, HyLo, The Crew Platform and others.

DISCUSSION

Recommended next steps

An intertwined theme across projects in this Needs Assessment is that for urban farming initiatives to be successful, they need to not only benefit individuals, communities, and institutions, but also that there is long term sustainability of the business, non-profit, or volunteer base. To get to long term sustainability that leads to staying on the land, soft skills of leadership development, conflicts resolution, fundraising, advocacy and organizing are needed among project leaders. There are many challenges and issues that can lead to failures in organizational development whether via non-profit/volunteer management or business administration. Without an underlying sustainably operational system, due to high costs of living in the Bay Area, farmers and policy leaders doing transformational work find it difficult to maintain activities longer than two years, and most did not have a written land use agreement beyond five years.

Food systems are complex and often competitive, so entrepreneurial efforts that lack proper business plans and implementation practices and safety nets can face challenges. The Urban Ag Program's framework for supporting local food production and enhancing local food systems

was to support urban residents in becoming community food producers (AB 1990), who can not only grow local food but also safely and legally prepare and package value added products through Cottage Food Act (AB 1616); and, in the process, boost the local economy and food system by becoming a micro-enterprise home kitchen operations (AB 626) MEHKO. Hence, those who participate in any component of that framework may or may not become an entrepreneur, but, have more experiential exposure to opportunities along any trajectory direction withing workforce development and STEM pathways along the 'Micro-Farm to Fork' food web. Here, the goal is that land stewards and program participants diversify their food and agricultural skills sets so as to increase their capacity to innovatively grow their role in the food, agriculture and land stewardship neighbor-food web.

This framework is especially beneficial because of the low economic entry barrier for small business operations, opportunities for free technical advice and overall low costs for starting a small business. Still, the difficulty in sustainability of food entities as a whole can be extrapolated to encompass similar challenges in the broader food and agricultural systems. This is especially important when considering that urban agriculture is not operating in a local vacuum but is in many ways rebuilding a new agriculture and food system in both direct and indirect competition with conventional agriculture and industrial food complex.

New developments since the end of this needs assessment

One new effort emerging in from 2015-2018 was the Good Food Purchasing Policy, which provides a structure for public institutions to shift food purchases to a more transparent and equitable food system (Center for Good Food Purchasing, 2023). An example of this is the San Francisco Unified School District spending \$1.5 million of \$7.6 million annual food budget to purchase from family owned or cooperatively owned farms within 250 miles (Center for Good Food Purchasing, 2023; Ettman, 2019). Similarly, if large public and private entities and institutions participate in the Good Food Purchasing Program, a funding mechanism could grow for more small, local farmers to be economically sustainable.

Another creative approach to food insecurity is Food As Medicine, in which Doctors can prescribe healthy fresh produce to those with chronic dietary and other health impacting illnesses. The work on this trajectory is a bright star on the path towards better health outcomes in low-income communities, and the network that has rallied to support such a dynamic approach has led to advocacy at the national scale, with Congress being lobbied to permit this universally. As such, support for emerging urban farmers who may be our best resource for tomorrow's farming efforts may come from the healthcare and allied industries concerned about the well-being of low-income residents, and therein resides opportunities for rebalancing inequitable food resource distribution.

Urban agriculture increases connectivity and cooperation amongst urban farm stewards, local communities, institutions and businesses. In California, county, city and state governments have a willing role to play in support of organizations, businesses and community-based volunteer groups with food security missions to grow, market and distribute produce in and around cities. Goals and related activities could benefit from a strengthening of the urban ag network in the Bay Area through greater linkages, and opportunities for more dialogue through tools like the Urban Ag Map, the Bay Area Urban Farming Resource Guide, a newsletter with workshops details in multiple languages, and direct URL links to individual groups through an Urban Ag Sites Directory. Unfortunately, UC Cooperative Extension has discontinued the UCCE Bay Area Urban Ag & Food Systems Program in how it was previously operated. Lessons derived from this Needs Assessment, the new mission for the program, and recommended work planned activities to follow were:

The UC Cooperative Extension urban ag and food systems program's new mission was to conduct applied research and education supporting healthy and safe food and lands access and security for diverse, low-income residents of Alameda, Contra Costa, San Francisco, and serve as a resource in San Mateo, Santa Clara and the North Bay as needed. Program staff provided agricultural technical assistance and resources to urban farms, community and school gardens,

faith based, institutional, residential and therapeutic food growing groups as able. Collaborations partnered with local non-profit organizations, community-based volunteer groups, policy makers and governmental agencies to leverage in-kind resources, grants and donations for this purpose. The program monitored and evaluated impacts in terms of knowledge, behavior and condition changes through a participatory approach. Such inclusion encompassed an equity lens focused on food security, resource conservation, environmental quality, youth, human, social and economic development, food as medicine and food growing activities as horticultural therapy.

Themes derived from needs

1. Technical and Curricular Education with Workforce Development Credentialing
2. Risk Management in Urban Soil Quality, Food Safety, Water Re-Use & Disaster Resilience
3. Urban Farm Operational Management Efficiencies and Costs Reduction
4. Micro Farm to Fork: Food Policy, Systems & Environments (PSE) as a Tool to Increase both Access and Security to Healthy Food and Healthy Land
5. Emerging Theme: Incorporate Therapeutic Horticulture in Urban Ag & Food Systems

Recommendations

The recommendations below was to aid UCANR's Bay Area Urban Agriculture Program in achieving the long-term goals of enhancing food security for the urban ag system:

- Expand Urban Ag Mapping Project to build viability of the Urban Farming and Food Growing Network and update the urban ag website and make access it more equitable and user friendly in terms of font size, border colors, and by being unassuming in approach.
- Increase outreach and education efforts through partnership with Resource Conservation Districts, and other school, utility and parks districts stewarding lands which may be accessed for urban farming.
- Seek grants for supporting sustainable water management, irrigation, composting, soil health, hedgerow, pollinator patches, technical assistance and carbon sequestration.
- Align multiple counties sustainability goals over time, with joint urban farmers' visioning.
- Help small growers connect to fair price markets via added value products, small food stands, local accessible markets, healthy retail stores, and larger institutional buyers.
- Identify additional opportunities to grow food in Oakland, San Francisco, San Jose, Berkeley, Richmond and many other Cities' roof tops, parks, etc.
- Update the Bay Area Farming Resource Guide and make it more accessible in multiple languages, and with bigger font sizes.
- Grow educational and workforce development opportunities for youth employment in urban ag, and other associated non-traditional green job training options.
- Support immigrant communities with more access to land, information and resources.
- Provide education and training in food preservation, floriculture, poultry management, beekeeping, native plant nursery management, tree care and food safety.
- Develop accessible educational material and technical information on cultivating mushrooms.
- Facilitate low entry-cost-backyard ag project operations for small start-ups such as small orchards, home gardens, vermicompost, poultry, beekeeping, aquaponics, and support micro-business development and aging mature adults'-employment ion these newer ag sectors at the block association and neighborhood consumption level, etc.
- Identify and support new grassroots organizations doing food, ag and farm food systems work, grow awareness of them within local chambers of commerce and business districts.
- Improve research and data collection by weighing donated gleaned food from farmers markets, testing irrigation waters, soils and soil dust and mapping testing sites, gleaned fruit trees, composting, farmer's markets and keeping water on land.

The UCCE Urban Ag Map website could not only house the urban ag map for Alameda County, but it will link to each of the Bay Area Counties other UCCE County Urban Ag Maps, a Bay Area Urban Farming Resources Guide, and a future Urban Ag Site Directory being developed. These three tools, coupled with a seasonal newsletter, can create blossoming networks and diversified income streams, allow for greater social capital to be cultivated that makes these urban farms have added community value, bolsters their abilities to resist economic shocks, and sometimes unwanted high end real estate development.

Role of Bay Area Urban Ag & Food Systems Program

The University of California Cooperative Extension Urban Ag & Food Systems Program's role was to provide and/or leverage resources, increase urban food growers' capacity for success, and offer local educational programming-inclusion where possible, all in a manner whereby city farmers' time is valued and their self-determination in future viable funding strategies is strengthened. Technical assistance contributed to building capacity, sustainability, viability, longevity for urban food growers' long-term success. More robust collaborations via formalized partnerships can build/rebuild cross-generational understanding and realize existing resources in as local skills and assets already in place to help mitigate urban ag challenges via community and environmental development that is community driven, and equitably inclusive of diverse needs.

The examples and needs outlined in this assessment, as well as in previous urban ag assessments, unfortunately highlight similar economic, policy and technical barriers that require systematic and policy changes. By directly and collectively addressing these needs, UC Cooperative Extension and collaborative stakeholders can increase the opportunity for individuals and families to grow together, supplement their diets with local organic food plus as entrepreneurs innovating their micro businesses. Neighbors can break down their fences and grow food for a neighborhood Community Supported Agriculture or a Micro-Entrepreneurial Home Kitchen Operation restaurant. Immigrant grandparents or parents with subsistent agrarian background can pass on generational knowledge, share their cultural history and grow culturally relevant produce. Stay at home parents can certify their kitchen as a cottage food operation for canning, jamming and other food preservation to produce value added products for supplemental income. Cities can ultimately contribute to creating the next innovative generation of land/ecological stewards, food system leaders and young farmers.

CONCLUSION

Most urban farms, community, school, faith-based, therapeutic or institutional farms and gardens in the Bay Area operationally practice far more than the simple actions of cultivating soils and seeds to harvest tubers and bulbs, leafy greens, stems and fruits. While cultivating food on lands urban growers do not own, they are frequently seen as service providers and community leaders, while their sites grow into healthy activity hubs. As a result, their urban and community farm and garden sites become natural local neighborhood resource and educational centers evolving into spaces for self-determination and collective efficacy at the community level.

As blighted urban areas in the United States revitalize from long periods in which they were historically under-resourced, these neighborhoods experience economic changes because land values increase, and private landowners often sell their properties at higher market values. Under these circumstances, maintaining access and tenure to lands they steward becomes hard unless funds and resources are obtained by other means, and these are ongoing challenges for small urban farm cultivators, even if ownership is unattainable. Other revenue sources may include food sales, educational programs, hosting cultural events or rites of passage, or other land use activities that balance local needs for site management.

Urban Agriculture has the greatest potential when site operational costs are kept down, and natural resources are optimally conserved for improved environmental quality, plus community interactions that cultivate these activity hubs' value among neighbors, businesses, and community

residents. Urban farm spaces can also be places where the same human values shared with more peri-urban and rural farmers, particularly values centered on how working lands are managed, can build bridges that complement supply chains and make urban farms places for linking consumers to regional farmers. Whether they are for-profit/donating urban farms, non-profit community gardens, faith-based, therapeutic, or school gardens, they will need to keep costs down. Their costs may be covered by produce or value-added product sales or services, programs and innovative fundraising ideas that diversify their economic base of local community support.

For urban counties, cities and institutional jurisdictions to effectively address health, racial and environmental injustices, they could invest in authentic relationship building by uplifting urban growers. This means actually providing economic resources, and genuine political support in full partnerships with low income and diverse communities' leaders in food, agricultural and land stewardship. Policy makers and food systems stakeholders can optimize urban farms and gardens' role as an open space resource and hub for neighborhood constituents by deterring development pressures and investing in the effectiveness of these spaces for community engagement, self-determination, disaster resilience and collective efficacy. Resilient communities across the San Francisco Bay Area are implementing sustainable agricultural practices, cultural food preservation, community programming and building healthy communities through urban agriculture and food systems that value diversity in all aspects.

One pathway for local food production and food system enhancement is educating urban residents about three California laws enabling urban food growing by becoming community food producers at their residences or at a local community facility (AB 1990); becoming a cottage food operators safely and legally selling prepared and packaged value added products through California Homemade Food Act (AB 1616); and the opportunity for becoming Home Cooks as microenterprise home kitchen operators (AB 626). These entrepreneurial and community based organizational development strategies can boost local agroeconomic impacts when integrating communal neighborfood cultivation as open space stewardship turning urban greening activities into micro-farm to fork models.

Since the end of this needs assessment, newly developed good food purchasing policies have begun helping diversify urban and small farmers' income streams uplifting urban agriculture as a part of the solution to climate change, social inequities and rapid global urbanization. The economic costs and benefits of these efforts can be localized through Good Food Purchasing criteria for ensuring locally grown, sustainably cultivated food that is most accessible at the institutional and neighborhood level, as begun in multiple Bay Area Counties (Ettman, 2021). Hospitals, schools, and other institutions with large food budgets can support local, urban, and small farmers through the Good Food Purchasing Policy. There is significant room for growth of this new program by other institutions pledging to also adopt good food purchasing criteria (Ettman, 2022; Ettman, 2021; Ettman, 2020; Ettman, 2019).

Due to climate change, the need for comprehensive community greening program efforts like urban/community agriculture and tree stewardship, organic and food waste reduction/composting, urban storm-water management enhancements and built environment green infrastructure like rooftop farms is ever present. Consequently, broad county and municipal programs are needed that are consistently budgeted and staffed, not relying on capital project funding or grants along, but, on sustained multi-year governments investing in their communities through community education and environmental development. Public and private land-use types can be integrated in unified programs and linked with under resourced groups trained to utilize all the tools and policies described in the above toolbox. Collective efficacy and self-determination can strengthen bonds among organizations with community-based facilities, local residents and businesses all who have the potential to grow in their intercultural understanding through food, agricultural and lands stewardship experiences undertaken together. Successful implementation will require stable and adequate funding and staffing that can spur optimally engaged block association-level food security and resilience within each local neighborfood web.

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