



To: Honorable Mayor and Members of the City Council  
From: Vice Mayor Ben Bartlett (Author), Mayor Jesse Arreguin, Councilmember Kate Harrison, and Councilmember Sophie Hahn (Co-Sponsors)  
Subject: Berkeley Food Utility and Access Resilience Measure (FARM)

RECOMMENDATION

1. Refer to the City Manager to protect the City’s food supply from natural disasters and economic disruptions by facilitating and chartering a community-based non-profit organization charged with designing and implementing an integrated local food production and distribution system for Berkeley.
2. Refer to the City Manager and the Office of Economic Development to design and offer economic incentives for non-profits, agricultural producers, and small businesses to partner with the City of Berkeley in support of the FARM.

BACKGROUND & CURRENT SITUATION

Berkeley is home to the local foods revolution, yet thousands of Berkeley residents are food insecure. Natural disasters and economic downturns exacerbate this insecurity and climate change increases the likelihood and severity of food supply interruption.

Berkeley has the framework for food resiliency through its successful farmers’ market; service providers who have been providing meals to homeless individuals since the early 1970s; community groups like Consider the Homeless and Food Not Bombs, which distribute food to homeless populations; and the Berkeley Food Network (BFN). Founded in 2016 in collaboration with community organizations, BFN promotes access to nutritional food by using “innovative, community-centered solutions to build a more sustainable, resilient, and equitable food system.”<sup>1</sup>

The City should preemptively safeguard its residents from a food supply interruption through a Food Utility and Access Resilience Measure (FARM). A FARM initiative achieves food resilience by (1) developing local food production sources; (2) connecting these sources to each other and local community hubs, including food banks, grocery stores, restaurants, and local schools; and (3) powering local food production sources using renewable energy with battery backup storage that can operate despite disruptions to the main power grid. These efforts will be assisted by the requirements under SB 1383, which requires restaurants and grocery stores to compost left-over food. These businesses would benefit from having a lower cost method of disposing of still fresh but excess food.

1. Community resilience

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<sup>1</sup> Berkeley Food Network, *About BFN*, (last accessed Jan. 5, 2023), <https://berkeleyfoodnetwork.org/who-we-are/about/>.

Government planners are faced with an emergent set of existential threats to populations and infrastructure. Many threats stem from the rapid advancement of climate change, with the increasing frequency of extreme weather events, such as hurricanes, tornadoes, floods, droughts, and fires. In addition to climate disasters, disaster preparedness must brace for pandemics, electrical failure, targeted violence, and cyber attacks, water and energy infrastructure failure, sea level rise, supply chain breakdown, and food insecurity. These threats arise from a variety of sources and therefore require a systems-level approach that addresses all the possible points of failure in an urban food supply chain.

Accordingly, policymakers are embracing new emergency preparedness and disaster mitigation models centered on equity and resilience at the community level (community resilience). Community resilience refers to the ability of a community to withstand and recover from disruptions, such as natural disasters, economic downturns, or health crises. Community resilience leverages local community networks; local knowledge; local communication channels; local resources; and local bodies of governance and leadership.

## 2. Food resilience

One component of community resilience is food resilience, which refers to the ways in which a community can ensure its members have access to healthy and nutritious food, even during times of crisis. This can involve a variety of strategies, such as growing food locally, supporting local agriculture, building community gardens, developing food storage and preservation facilities, and forming relationships with local food producers. By building a resilient local food system, communities can reduce their reliance on remote sources of food and ensure that they are able to continue providing sustenance for residents, even during challenging times.

FARM's development of a local, resilient food system empowers the City of Berkeley to achieve one of its key Climate Action Plan goals. Adopted in 2009, the Climate Action Plan calls for the "majority of food consumed in Berkeley" to be produced locally.<sup>2</sup> By creating a network of local food production, FARM lays the foundation for local, higher yield production of nutritious food that the City can scale up to meet its goal. This environmental objective is intertwined with resilience. Lowering the distance between the location of production and consumption improves the ability to supply food to the people of Berkeley despite disruptions to transportation.

The State of California and the US Federal Government are increasingly incorporating food resilience in disaster planning and view food security as foundational to any resilience effort. For example, California's budget for fiscal year 2022-23 allocates \$477

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<sup>2</sup> City of Berkeley, *Berkeley Climate Action Plan*, (June 2, 2009), <https://berkeleyca.gov/your-government/our-work/adopted-plans/berkeley-climate-action-plan>.

million toward agricultural resilience measures, including climate-friendly agriculture, soil health, water efficiency, and wildfire prevention.<sup>3</sup>

Additionally, California’s Strategic Growth Council (SGC) has called for local-level resilience through its Community Resilience Centers (CRC) program. The CRC program will “fund new construction and upgrades of neighborhood-level resilience centers to provide shelter and resources during climate and other emergencies . . .”<sup>4</sup>

At the federal level, President Joe Biden signed National Security Memorandum-16 (NSM-16) in November 2022 “to strengthen the security and resilience of United States food and agriculture.” NSM-16 provides a process for identifying and assessing threats to food security, strengthens relationships with the private sector, and promotes systems that respond to disruptions in the food sector.<sup>5</sup>

### 3. *Food is a fundamental human right.*

It has been often said, “There are only nine meals between mankind and anarchy.” And Vladimir Lenin said, “Every society is three meals away from chaos.” Like air and water, food is essential for survival and the only commodity that cannot be postponed. When social, economic, or ecological barriers block access to nutritious food, people suffer. Food-insecure individuals have higher rates of mental health issues, and hungry children attain lower academic achievement than their peers.<sup>6</sup>

The United Nations recognizes the fundamental right to food for all. At its core, this right is the right to “all nutritional elements” necessary to live a “healthy and active life” and to the means to access these elements.<sup>7</sup> The access portion of this right focuses on physical and economic access.<sup>8</sup>

The US federal government has failed to legally recognize such a right, but some states have made progress. In 2021, the State of Maine recognized the right to food in its constitution.<sup>9</sup> The amendment declares that “all individuals have the right to grow, raise, harvest, produce and consume the food of their own choosing for their own

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<sup>3</sup> Arohi Sharma, *FY22 California Budget Invests in Agricultural Resilience*, NRDC (Sep. 21, 2022),

<https://www.nrdc.org/experts/arohi-sharma/fy22-california-budget-invests-food-farm-resilience>.

<sup>4</sup> Cal. Strategic Growth Council, *SGC Launches Development of Community Resilience Centers (CRC) Program*, (July 5, 2022),

<https://sgc.ca.gov/news/2022/07-05.html>.

<sup>5</sup> See National Security Memorandum on Strengthening the Security and Resilience of United States Food and Agriculture, (Nov. 10, 2022),

<https://www.whitehouse.gov/briefing-room/presidential-actions/2022/11/10/national-security-memorandum-on-on-strengthening-the-security-and-resilience-of-united-states-food-and-agriculture/>.

<sup>6</sup> Arohi Pathak, Ryan Richards & Marc Jarsulic, *The United States Can End Hunger and Food Insecurity for Millions of People*, Center for American Progress Action Fund (Aug. 11, 2022),

<https://www.americanprogress.org/article/the-united-states-can-end-hunger-and-food-insecurity-for-millions-of-people/>.

<sup>7</sup> Off. of the High Comm’r for Hum. Rts., *The Right to Adequate Food*, Fact Sheet No. 34 (Apr. 2010),

<https://www.ohchr.org/sites/default/files/Documents/Publications/FactSheet34en.pdf>.

<sup>8</sup> *Id.*

<sup>9</sup> Tess Brennan, *Maine Becomes the First US State to Recognize the Right to Food in a Constitutional Amendment*, Universal Rts. Grp. Geneva (Jan. 19, 2022),

<https://www.universal-rights.org/blog/maine-becomes-the-first-us-state-to-recognise-the-right-to-food-in-a-constitutional-amendment/>.

nourishment, sustenance, bodily health, and well-being.”<sup>10</sup> This amendment follows Maine’s 2017 Food Sovereignty Act, which built a food sovereignty foundation by permitting municipal governments to regulate local food systems with the guarantee of state recognition.<sup>11</sup>

4. Food insecurity rates are rising in the Bay Area.

Food insecurity is a growing crisis throughout the US. The US Department of Agriculture (USDA) defines food insecurity as “a household-level economic and social condition of limited or uncertain access to adequate food.”<sup>12</sup> The USDA found that in 2020, almost 14 million households (10.5% of the population) did not have enough food to meet their needs. In California alone, more than 4 million people were reported to be food insecure in May 2022,<sup>13</sup> and In the Bay Area, food insecurity is increasing. In 2018, the San Francisco Chronicle reported that 11.5% of Bay Area residents, 870,000 people, were food insecure.<sup>14</sup> The economic and public health impacts of COVID-19 exacerbated food insecurity. A 2021 study by San Jose State University found that Bay Area food insecurity rates spiked from 20% to 33% from the beginning of the COVID-19 pandemic to March 2021.<sup>15</sup>

In Berkeley and Albany pre-pandemic, an estimated 24,000 individuals were food insecure.<sup>16</sup> The demand for food aid in Berkeley increased sharply during the pandemic, forcing the Berkeley Food Network (BFN) to *triple* its operations in the first half of 2020.<sup>17</sup>

Although many households are still bearing the economic impacts of COVID-19, the USDA is cutting SNAP benefits (CalFresh) to pre-pandemic levels after the February 2023 issuance.<sup>18</sup> This deduction comes at a time of record-high food inflation; the US Bureau of Labor statistics reported that prices for food at home increased by 13.5% in the 12 months ending in August 2022.<sup>19</sup> This spike is “the largest 12-month percentage increase since the period ending in March 1979.”<sup>20</sup>

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<sup>10</sup> *Id.*

<sup>11</sup> *See id.*

<sup>12</sup> USDA, *Definitions of Food Security*, <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/definitions-of-food-security/>.

<sup>13</sup> Toni Koraza, *California to Face a Devastating Crisis*, NewsBreak (May 5, 2022), <https://original.newsbreak.com/@toni-koraza-561162/2590989189701-california-to-face-a-devastating-crisis>.

<sup>14</sup> Tara Duggan, *How Families Slip Through*, San Francisco Chronicle (Nov. 18, 2018), <https://www.sfchronicle.com/food/article/The-hidden-hungryA-Bay-Area-paradox-13379274.php>.

<sup>15</sup> Giselle Pignotti et al., *Food Insecurity and Food Access during COVID-19 in the San Francisco Bay Area*, San Jose State Univ. (Mar. 2021).

<sup>16</sup> Berkeley Food Network, *Programs*, (last accessed Dec. 20, 2022), <https://berkeleyfoodnetwork.org/what-we-do/programs/>.

<sup>17</sup> Berkeley Food Network, *Major Hunger-Relief Investment Will Help Alleviate Growing Food Insecurity in Berkeley*, (May 19, 2020), <https://berkeleyfoodnetwork.org/major-hunger-relief-investment-will-help-alleviate-growing-food-insecurity-in-berkeley/>.

<sup>18</sup> USDA, *Changes to SNAP Benefit Amounts - 2023*, (updated on Feb. 17, 2023), <https://www.fns.usda.gov/snap/changes-2023-benefit-amounts>.

<sup>19</sup> Bureau of Labor Statistics, *Prices for Food at Home Up 13.5 Percent for Year Ended August 2022*, The Economics Daily (Sep. 15, 2022), <https://www.bls.gov/opub/ted/2022/prices-for-food-at-home-up-13-5-percent-for-year-ended-august-2022.htm>.

<sup>20</sup> *Id.*

The growing demand for food aid in Berkeley, coupled with recent reductions in government food benefits, highlights the fragility of the degree of food accessibility at any given time. If there is a disruption in the food supply chain, households that are already food insecure will face even greater barriers to food access. Further, the COVID-19 pandemic demonstrated that disruption would drastically increase the number of households that are food insecure. Without a safety net to insulate our community from these devastating supply chain shocks, a large proportion of households would find themselves in a struggle to survive.

5. *Natural disasters, climate change, and foreign conflicts further threaten food access.* Climate change, natural disasters, and increasing global conflict jeopardize the world's food security. The market for food spans internationally, so disruptions in one region send ripple effects, in the form of food scarcity or price shocks, throughout the rest of the food supply chain. The supply chain is fragile; it only takes a disruption in one of the chain's many links for consumers to lose access to healthy food.<sup>21</sup> Recognizing the supply chain's vulnerability, the USDA built a Food System Transformation framework to create a more resilient food network.<sup>22</sup> Climate change reduces food availability and is exacerbated by transporting food long distances that could be grown locally.

The COVID-19 pandemic disrupted “all segments of food supply chains,” including farming, food processing, transportation, and final demand.<sup>23</sup> At the farming level, labor-intensive farms—those producing crops like fruits and vegetables—suffered from production shortages when their sick workers were unable to work.<sup>24</sup> Labor shortages also inhibited food processing facilities, with many reporting high rates of worker absences during the pandemic.<sup>25</sup> Necessary pandemic measures severely impacted the transportation of fruits and vegetables. Fruits and vegetables are perishable foods with a “high value-to-weight ratio,” so they are transported on passenger planes. Declines in passenger air travel thus caused bottlenecks in fruit and vegetable transportation.<sup>26</sup> The last step in the supply chain is getting food to consumers. When consumers lost their jobs due to the initial economic downturn in 2020, they lost economic access to food, endangering those without social safety nets.

Like the COVID-19 pandemic, other natural disasters threaten global food security by disrupting agriculture production, food availability, and food accessibility. A survey on natural disasters between 2003 and 2013 by the Food and Agriculture Organization of the United Nations “showed 25% of disaster-related losses are in agriculture sectors . .

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<sup>21</sup> Mario Lubetkin, *2021 Revealed the Fragility of Food Systems*, ReliefWeb (Dec. 16, 2021), <https://reliefweb.int/report/world/2021-revealed-fragility-food-systems>.

<sup>22</sup> USDA, *USDA Announces Framework for Shoring Up the Food Supply Chain and Transforming the Food System to Be Fairer, More Competitive, More Resilient*, (June 1, 2022), <https://www.usda.gov/media/press-releases/2022/06/01/usda-announces-framework-shoring-food-supply-chain-and-transforming>.

<sup>23</sup> OECD, *Food Supply Chains and COVID-19: Impacts and Policy Lessons*, (June 2, 2020), <https://www.oecd.org/coronavirus/policy-responses/food-supply-chains-and-covid-19-impacts-and-policy-lessons-71b57aea/>.

<sup>24</sup> *Id.*

<sup>25</sup> *Id.*

<sup>26</sup> *Id.*

..”<sup>27</sup> The impact of a natural disaster depends on the type of natural disaster that occurs. For example, researchers report that droughts in China cut wheat yields by 5.8% over 30 years.<sup>28</sup>

These dangers hit close to home. A report by leading conservation research group NatureServe found that California, Texas, and the southeastern United States are where the highest percentages of plants, animals, and ecosystems are at risk.<sup>29</sup> Droughts are a growing danger in California that reduces usable farmland. In 2022, California’s irrigated farmland shrank by 752,000 acres (nearly 10%) compared with 2019, the year before the drought.<sup>30</sup> The amount of fallowed farmland in 2022 surpassed the peak during California’s last drought, which lasted from 2012 to 2016.<sup>31</sup>

While droughts are long-term natural disasters with creeping effects, wildfires can impact the supply chain immediately. During the 2020 California wildfires, the intense smoke made it unsafe for farm workers and livestock to be outdoors.<sup>32</sup> Without workers, farms had to plow under many crops, meaning these crops never reached consumers. Additionally, the wildfires destroyed vital land where farmers grew food; the fires destroyed the existing crops and contaminated the soil, jeopardizing future harvests.<sup>33</sup>

War can also disrupt the food supply chain. The Russian invasion of Ukraine, one of the world’s biggest wheat and corn producers, caused many countries to skyrocket food prices.<sup>34</sup> The invasion halted Ukrainian exports and damaged Ukraine’s rail infrastructure. As a result, large quantities of grain were trapped in Ukraine, preventing the entire 2022 harvest from having adequate storage space.<sup>35</sup> This supply shock affected countries throughout the world, including India, Egypt, and South Korea. Further, Russia was one of the top exporters of fertilizers before the invasion. Stricter controls on Russian exports caused the price of fertilizer to spike worldwide, leading farmers to reduce their planned harvests.<sup>36</sup>

## 6. Food Citizenship

“Food citizenship” describes the rights and responsibilities that individuals have in relation to the food they eat and produce. Food citizenship can include making informed

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<sup>27</sup> James Ducker, *Investigating the Impact of Disasters on Food and Agriculture*, AZO Life Sciences (last updated Nov. 26, 2021), <https://www.azolifesciences.com/article/Investigating-the-Impact-of-Disasters-on-Food-and-Agriculture.aspx>.

<sup>28</sup> Shi et al., *Crop Yield and Production Responses to Climate Disasters in China*, 750 *Science of the Total Environment* (2021).

<sup>29</sup> Brad Brooks, *Huge Chunk of Plants, Animals in U.S. at Risk of Extinction - Report*, Yahoo!News (Feb. 6, 2023), <https://news.yahoo.com/exclusive-huge-chunk-plants-animals-090952175.html>.

<sup>30</sup> Ian James, *‘It’s a Disaster’: Drought Dramatically Shrinking California Farmland, Costing \$1.7 Billion*, Los Angeles Times (Nov. 23, 2022), <https://www.latimes.com/environment/story/2022-11-23/drought-cost-california-agriculture-1-7-billion-this-year>.

<sup>31</sup> *Id.*

<sup>32</sup> Phil Lempert, *California Wildfires: The Enormous Effect on Our Food Supply*, Retail Dietitians Bus. Alliance (Dec. 9, 2020), <https://www.retaildietitians.com/articles/california-wildfires-the-enormous-effect-on-our-food-supply/>.

<sup>33</sup> *Id.*

<sup>34</sup> Rob Garver, *Global Food Prices Rise with Ukraine-Russia Agreement in Doubt*, VOA News (Oct. 31, 2022), <https://www.voanews.com/a/global-food-prices-rise-with-ukraine-russia-agreement-in-doubt-6813606.html>.

<sup>35</sup> Dea Bankova, Prasanta Kumar Dutta & Michael Ovaska, *The War in Ukraine is Fuelling a Global Food Crisis*, Reuters (May 30, 2022), <https://graphics.reuters.com/UKRAINE-CRISIS/FOOD/zjvqgjomjv/>.

<sup>36</sup> *Id.*

choices about food purchases and consumption, supporting sustainable and ethical food systems, and advocating for food policies that prioritize the health and well-being of individuals and the environment. Food citizenship can also involve taking action to address issues such as food waste, hunger, and access to healthy food in underserved communities. Essentially, being a food citizen means actively engaging in the food system and working towards creating a more sustainable and equitable food system for all.

Food citizenship can play an important role in promoting community resilience by supporting local food systems and promoting food security. When communities have access to healthy and sustainable food sources, they are better able to withstand and recover from disruptions, such as natural disasters or economic downturns.

If a community is able to grow or produce its own food, it is less dependent on outside sources and can continue to provide for itself in the event of a supply chain disruption. Additionally, supporting local food systems can help to boost the local economy and create jobs, which can increase the overall resilience of the community.

Further, food citizenship can promote food justice and equity within a community, ensuring that all members have access to healthy and affordable food. This can reduce food insecurity and prevent vulnerable populations from being disproportionately affected by disruptions to the food system.

7. *A food resilience system could insure Berkeley against disruptions in the food supply chain.*

Building a food resilience system *before* a supply chain disruption protects food-insecure households and prevents more households from becoming food insecure. Food resilience is the ability to withstand and recover from disruptions to food access in a way that ensures a sufficient supply of acceptable and accessible food for all<sup>37</sup>.

8. *FARM as a Community Food Utility: Overview*<sup>38</sup>

The mission of FARM is to foster a resilient food system that can withstand supply chain shocks and ensure all people in the community have access to adequate amounts of wholesome, nutritious foods produced by ecologically sound and socially responsible means. FARM would be a chartered public utility based on the concept of food citizenship, similar to the existing utilities for energy and water systems. FARM would have three major components: a) Community Layer, b) Food Production Layer, and c) Energy Resilience.

a. Community Layer

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<sup>37</sup> Johns Hopkins Center for a Livable Future, *Food System Resilience*, <https://clf.ihsph.edu/projects/food-system-resilience>.

<sup>38</sup> Ikerd, J. (n.d.). *Enough Good Food For All; A Community Food Utility*. Communityfoodutility. Retrieved January 4, 2023, from <https://sites.google.com/site/communityfoodutility?pli=1>

Growing food locally promotes physical access to food in times of crisis. To ensure that enough food is locally grown, it is critical to connecting community gardens, backyard gardens, and other urban farms into a production network with delivery centers.

i. Community Gardens and Backyard Gardens

The FARM should create a network of community gardens and backyard gardens in order to support community resilience by providing local food sources, fostering social connections, and promoting environmental sustainability.

Community gardens and backyard gardens can provide communities with a local source of fresh, healthy, and affordable produce. This can help to increase food security and reduce dependency on outside sources, making communities more resilient in the face of disruptions to the food supply chain. One backyard garden can provide food for up to six families.

Community gardens can also provide a space for community members to come together and engage in productive, healthy activities. This can help to build social connections and a sense of community, which are important for promoting resilience in the face of challenges.

Furthermore, community gardens and backyard gardens help to promote environmental sustainability and resilience by providing a space for growing food using sustainable and environmentally-friendly practices. This can help to reduce the community's overall ecological footprint and make it more resilient in the face of environmental challenges.

ii. Synchronizing Local Food Production with Food Banks, Restaurants, Schools, and Grocery Stores

Yields from local food production can be distributed to local food banks, restaurants, schools, and grocery stores. This omnichannel production and distribution model has two key benefits. First, it ensures that locally produced food is not wasted. Second, it provides a source of feedback for FARM because restaurants, schools, and grocery stores can provide guidance to FARM for improvements in usability, quantity, and quality.

iii. Supplemental Nutrition Assistance Program (SNAP)

The community layer should incorporate a SNAP group-buying mechanism whereby SNAP recipients can deposit assistance funds into a FARM account. In return, the FARM would ensure that each recipient received enough good food to meet their basic needs, regardless of the



amount of their individual SNAP payment. Some non-profit organizations are currently operating in this manner.<sup>39</sup>

b. Production Layer

Additionally, FARM would partner with urban agriculture companies and nonprofits with experience and expertise in producing high crop yields with accelerated harvest velocity in urban settings. The yields from these producers could supplement yields from existing community gardens while minimizing seasonal fluctuations and other disruptions in the supply chain.

To increase local food production, the City would offer certain economic incentives to urban agriculture companies to co-locate within the City of Berkeley. In exchange for these incentives, companies would agree to give the City Most Favored Nation (“MFN”) status, with the right of first refusal and right of first offer on the companies’ food items in the event of a local food supply chain disruption event (food shock). As discussed below, the FARM board will institute policies that define a food shock that triggers the MFN agreement. For example, the board may define a food shock to include a week-long interruption of certain food staples at two grocery stores.

Recent innovations continue to mitigate the historical limitations of urban agriculture: land, labor, and potential yield. A study on urban farms in New York City found that the crops in urban farms produced higher yields than their conventional farm counterparts, thus making up for the spatial limitations that urban farms may face.<sup>40</sup> Additionally, peri-urban farming, which produces substantial amounts of food on a relatively small amount of land on the fringes of a city, has emerged as a space-efficient form of urban agriculture.<sup>41</sup> Gotham Greens addresses the yield limit issue by growing crops inside greenhouses with hydroponic technology. Gotham Greens’ greenhouses are located near cities, allowing for proximity to communities while avoiding real estate constraints.<sup>42</sup> Closer to home, Upside Foods has opened a production facility to produce high-quality laboratory-grown meat at scale.<sup>43</sup>

i. Controlled Environment Agriculture (CEA)

CEA is an indoor food production method that uses stacked shelves, modular rack systems, or tower gardens to increase crop yields using less

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<sup>39</sup> See e.g., *Community Resilience Centers*, CA.gov (last accessed Nov. 30, 2022), <https://sdc.ca.gov/programs/community-resilience-centers/>.

<sup>40</sup> Mara Gittleman et al., *Using Citizen Science to Quantify Community Garden Crop Yields*, 5 *Cities and the Environment* (2012), <https://digitalcommons.lmu.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1095&context=cate>.

<sup>41</sup> Ina Optiz et al., *Contributing to Food Security in Urban Areas: Differences Between Urban Agriculture and Peri-Urban Agriculture in the Global North*, 33 *Agriculture and Human Values* (2016), <https://link.springer.com/article/10.1007/s10460-015-9610-2>.

<sup>42</sup> Gotham Greens, *Our Story*, <https://www.gothamgreens.com/our-story/>.

<sup>43</sup> Katie Spalding, *World’s Most Advanced Lab-Grown Meat Facility Opens in California*, IFL Science (Nov. 8, 2021), <https://www.iflscience.com/worlds-most-advanced-labgrown-meat-facility-opens-in-california-61548>.

surface area significantly.<sup>44</sup> Technologies such as ultra-efficient LED lighting, automated environmental control systems, and dehumidification recapture loops can dramatically reduce resource consumption, including consumption of energy, water, and nutrients. Photographs of such technologies are included in Attachment 1.

Exceptional yields and multiple harvests per year make indoor farming economically viable and sustainable over time. These two factors are possible because indoor farming creates an environment for resource-efficient methods like aeroponics<sup>45</sup> (i.e., spraying nutrient-rich mist on root zones that are suspended in the air) and aquaponics.

Aquaponics is a sustainable farming method that combines traditional aquaculture (raising fish) with hydroponics (growing plants in water without soil). In an aquaponic system, fish produce waste that is converted into plant nutrients. The plants, in turn, help to purify the water for the fish. This closed-loop system can be highly efficient, as it reduces the need for external inputs such as synthetic fertilizers and pesticides, and it allows for year-round production in a controlled environment. Aquaponics can be used to grow various vegetables, herbs, and other plants, as well as raise fish such as tilapia, trout, and bass. It can be a great option for urban farming, as it requires less space and water than traditional farming methods.

Compared to traditional farming techniques, aeroponics and aquaponics dramatically increase yields and quality while reducing water consumption by as much as 90%.<sup>46</sup>

ii. Repurposing Empty Commercial Space

Indoor farms can be developed in underutilized warehouses, shuttered big boxes retail locations such as the vacant CVS on Shattuck and Bancroft, and the vacant Walgreens on Ashby and San Pablo, or under freeway overpasses such as Gilman and I-80. To create dual-purpose land-use throughout the city, advanced greenhouses could be elevated above existing ground-level parking lots at locations such as Whole Foods in North Berkeley.

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<sup>44</sup> Sarah Federman, *Vertical Farming for the Future*, USDA (Oct. 25, 2021), <https://www.usda.gov/media/blog/2018/08/14/vertical-farming-future>; see e.g., Gardyn, *How It Works*, (last accessed Mar. 3, 2023), <https://mygardyn.com/how-it-works/>.

<sup>45</sup> See e.g., Rouses Markets, *Rouses Markets Creates Sustainable Aeroponic Rooftop Garden Above Downtown New Orleans Store*, Cision (May 17, 2012), <https://www.prnewswire.com/news-releases/rouses-markets-creates-sustainable-aeroponic-rooftop-garden-above-downtown-new-orleans-store-151890995.html>; *Rouses Roots on the Rooftop*, Tower Farms (last accessed Mar. 3, 2023), <https://www.towerfarms.com/us/en/possibilities/rooftop-farming/rouses-rooftop-farm>.

<sup>46</sup> Michelle Keller, *Aeroponics - What Is It & Why Is It Important?*, Living Greens Farm (Aug. 4, 2020), <https://www.livinggreensfarm.com/blog/what-is-aeroponics>.

c. Energy Resilience

The food production network should integrate renewable energy systems that can remain resilient in the event of a disruption to the energy grid. Such a system could employ local micro-grids with solar and storage to provide power to local food production facilities. Additionally, a renewable energy system could help limit environmental impact and reduce long-term costs.<sup>47</sup>

This renewable energy system would combine various methods of production to maximize redundancies and extend grid independence of the food resilience program in the event of a major energy crisis. Existing technologies such as rooftop solar arrays and onsite battery storage systems can be combined with emerging technologies such as urban wind turbines,<sup>48</sup> transparent solar panels that allow crops below to absorb energy,<sup>49</sup> and biofuel co-generators<sup>50</sup> for use when other means of production are not available. These emerging technologies should be considered and planned for when developing the energy independence component of FARM, placing Berkeley at the forefront of sustainability in urban farming.

9. FARM: Organization

The FARM will be a self-funded non-profit chartered by the City of Berkeley, with a self-appointed Board of Directors, approved by the City Council, with duties and administrative powers also approved by the City Council.

The FARM could be organized as a “vertical cooperative.”<sup>51</sup> A cooperative is a user-owned and controlled entity from which benefits are distributed equitably.<sup>52</sup> As a vertical cooperative, the FARM would operate on all levels of the vertical food system—linking producers, processors, distributors, retailers, and consumers. The system as a whole must be sustainable if the FARM continues to provide food security for the community. All recipients and participants in the vertical system would be members of the FARM cooperative.

10. FARM: Governance

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<sup>47</sup> US Department of Agriculture, *Rural Energy for America Program Renewable Energy Systems & Energy Efficiency Improvement Guaranteed Loans & Grants*, <https://www.rd.usda.gov/programs-services/energy-programs/rural-energy-america-program-renewable-energy-systems-energy-efficiency-improvement-guaranteed-loans>.

<sup>48</sup> IBIS Power, *Easily Upgrade Your Building to Renewable Energy*, (last accessed Dec. 20, 2022), <https://ibispower.eu/powerbest/>.

<sup>49</sup> Anthony Cuthbertson, *Record-Breaking Transparent Solar Panels Pave Way for Electricity-Generating Windows*, Independent (Oct. 28, 2022), <https://www.independent.co.uk/tech/solar-panel-world-record-window-b2211057.html>.

<sup>50</sup> Diego Perrone et al., *Energy and Economic Investigation of a Biodiesel-Fired Engine for Micro-Scale Cogeneration*, 14 *Energies* (2021), [https://www.researchgate.net/publication/348594263\\_Energy\\_and\\_Economic\\_Investigation\\_of\\_a\\_Biodiesel-Fired\\_Engine\\_for\\_Micro-Scale\\_Cogeneration](https://www.researchgate.net/publication/348594263_Energy_and_Economic_Investigation_of_a_Biodiesel-Fired_Engine_for_Micro-Scale_Cogeneration).

<sup>51</sup> John Ikerd, *The Economic Pamphleteer: Reflections on Cooperation*, *Journal of Agriculture, Food Systems, and Community Development* (2013), <https://doi.org/10.5304/jafscd.2013.032.001>.

<sup>52</sup> USDA, *Understanding Cooperatives: Cooperative Business Principles*, (Revised Apr. 2011), [https://www.rd.usda.gov/sites/default/files/publications/CIR\\_45-2.pdf](https://www.rd.usda.gov/sites/default/files/publications/CIR_45-2.pdf).

The FARM will begin with a volunteer, skills-based governing board, named the Food Security Council, with the City acting as a facilitator. Once the FARM has achieved grant funding, the Food Security Council members will be compensated. The Food Security Council should consist of community members, grant writers, SNAP recipients, food producers, an organized labor representative, and experts in resilience, logistics, renewable energy, and public health. All members would be appointed by the Berkeley City Council. The Food Security Council will have six core responsibilities:

1. Form the FARM as a non-profit organization;
2. Apply for grant funding;
3. Seek external partnerships;
4. Manage the FARM’s efforts to develop and maintain food production and distribution processes;
5. Determine the caloric needs of residents based on empirical evidence to set food production goals for the FARM; and
6. Define food shock events (e.g., how many days without staples constitute a food shock).

**11. FARM: Potential Funding Sources**

Funding sources include fees for administering government food assistance programs and grants from California, the USDA, and the Department of Energy (DOE) are available.

a. Federal and State Food Insecurity Related Grants and Programs

Grant or Program	Amount	Source/ Sponsor	Eligible Projects
<a href="#">Local Foods, Local Places</a>	-	USDA and EPA	Developing the local food economy. Examples: community gardens, kitchens, farmer's markets, and other food-related enterprises that can create new businesses and revitalize main streets, improve access to fresh, local food, and protect the environment.
<a href="#">Community Food Projects Competitive Grants Program (CFPCGP)</a>	\$25K-35K in planning; Up to \$125K per year for up to four years	USDA	Planning toward the improvement of community food security in accordance with the goals of CFPCGP.
<a href="#">The GusNIP - Nutrition</a>	-	USDA	Projects intended to increase the purchase of fruits and vegetables by providing

<a href="#">Incentive Program</a>			incentives at the point of purchase among income-eligible consumers participating in the USDA Supplemental Nutrition Assistance Program (SNAP)
<a href="#">Farm to School Grant</a>	Up to \$500K	USDA	Linking local producers with schools and other organizations participating in child nutrition programs working to purchase and include locally grown fruits, vegetables, grains, meat, dairy, and seafood in program meals.
<a href="#">Conservation Innovation Grants</a>	-	USDA	Projects supporting the development of farming technology to efficiently increase agricultural production through the conservation of natural resources, such as water and soil.
<a href="#">The Farmers Market Promotion Program (FMPP)</a>	-		Projects that develop, coordinate, and expand direct producer-to-consumer markets to help increase access to and availability of locally and regionally produced agricultural products by developing, coordinating, expanding, and providing outreach, training, and technical assistance to domestic farmers markets, roadside stands, community-supported agriculture programs, agritourism activities, online sales or other direct producer-to-consumer (including direct producer-to-retail, direct producer-to-restaurant, and direct producer-to-institutional marketing) market opportunities.
<a href="#">Local Food Promotion Program</a>	\$25,000 to \$100,000 (for Planning projects) and \$100,000 to \$500,000 (for Implementation and Farm to Institution projects)	USDA	Grants for Planning projects help food businesses to develop and test services. Grants for Implementation projects fund the creation of food businesses like community kitchens. Grants for Farm to Institution projects support institutional food services like schools with linkage to farms.

<a href="#">Food and Agriculture Service Learning Program</a>	-	USDA	For private organizations or non-profits to increase the capacity for food, garden, and nutrition education within host organizations or entities, such as school cafeterias and classrooms while fostering higher levels of community engagement between farms and school systems by bringing together stakeholders from distinct parts of the food system.
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b. Federal and State Resilience Grants and Programs

<b>Grant or Program</b>	<b>Amount</b>	<b>Source/ Sponsor</b>	<b>Eligible Projects</b>
<a href="#">CA Community Resilience Centers</a> (anticipated release in spring 2023)	-	California Strategic Growth Council	New construction and upgrades of neighborhood-level resilience centers to provide shelter and resources during climate and other emergencies. The program will also fund year-round services and ongoing programming that build overall community resilience.
<a href="#">Building Resilient Infrastructure and Communities (BRIC) Grant</a>	-	FEMA	Hazard mitigation projects, reducing the risks they face from disasters and natural hazards.
<a href="#">Hazard Mitigation Grant Program (HMGP)</a>	-	FEMA/ OEM	Developing hazard mitigation plans and rebuilding in a way that reduces, or mitigates, future disaster losses in local communities.
<a href="#">Regional Resilience Planning and Implementation Grant Program</a>	-	Governor's Office of Planning and Research	Advancing resilience and responding to their greatest climate risks through three major activities: capacity building, planning (including identifying climate resilience priorities), and project implementation.

<a href="#">CA Transformative Climate Communities</a>	-	California Strategic Growth Council	Development and infrastructure projects that achieve major environmental, health, and economic benefits in California’s most disadvantaged communities.
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c. Federal and State Renewable Energy Grants and Programs

Grant or Program	Amount	Source/ Sponsor	Eligible Projects
<a href="#">Energy Efficiency and Conservation Block Grant (EECBG) Program</a>	\$500,000,000	Department of Energy	Development and implementation of an energy efficiency and conservation strategy; establishment of financial incentive programs for energy efficiency improvements.
<a href="#">CA Transformative Climate Communities</a>	-	California Strategic Growth Council	Development and infrastructure projects that achieve major environmental, health, and economic benefits in California’s most disadvantaged communities.
<a href="#">CA Distributed Electricity Backup Assets Program</a>	-	California	Construction of cleaner and more efficient distributed energy assets that would serve as on-call emergency supply or load reduction for the state's electrical grid during extreme events.
<a href="#">CA Climate Catalyst Revolving Loan Fund</a>	-	California Infrastructure and Economic Development Bank	<p>Projects that promote climate-smart technologies and practices across the agricultural value chain</p> <p>Projects may include (but are not limited to):</p> <ul style="list-style-type: none"> <li>● On-farm and food processing renewable energy, including electricity, fuels, and bioenergy</li> <li>● Energy, water, and materials efficiency</li> <li>● Methane reduction projects that use best practice approaches consistent with state policy goals</li> <li>● Energy storage or microgrids</li> <li>● Equipment replacements</li> </ul>

<a href="#">Renewable Energy For Agricultural Program (REAP)</a>	-	California Energy Commission	Installation of renewable energy technologies serving agricultural operations to reduce greenhouse gas emissions.
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**12. Berkeley is well positioned for a food resilience program.**

The City of Berkeley has already taken steps that facilitate a food resilience program. In 2018, the City updated its Urban Agriculture Ordinance, lowering barriers to urban farming in Berkeley.<sup>53</sup> The update reduced the permit costs for larger-scale farming projects to \$1000 and removed requirements that restricted farming to select city-owned properties.<sup>54</sup>

**ENVIRONMENTAL SUSTAINABILITY**

A food resilience program that involves urban agriculture is expected to reduce pollution from food transportation. Urban agriculture shortens the supply chain, truncating the journey from farm to table.

**REVIEW OF EXISTING PLANS, PROGRAMS, POLICIES, AND LAWS**

Adopted in 2009, Berkeley’s Climate Action Plan outlines a vision for a more sustainable city. One key goal in the Plan is for the “majority of food consumed in Berkeley” be produced locally.<sup>55</sup> FARM advances this goal by bringing food production and individuals closer together.

On July 24, 2022, the City of Berkeley adopted an ordinance that updated the municipal code on urban agriculture as follows<sup>56</sup>:

**Purpose (23.318.010)**

The purpose of the Urban Agriculture related regulations contained in this chapter is to provide the following community benefits:

- A. Support the local economy and increase access to fresh local produce.
- B. Strengthen the health and social fabric of communities by encouraging and supporting community gardens.
- C. Accomplish the Berkeley Climate Action Plan goal of supporting efforts to build more complete and sustainable local food production and distribution systems

**Applicability (23.318.020)**

These regulations supersede definitions of incidental or ancillary uses.

**Urban Agriculture Uses and Levels of Discretion (23.318.030)**

<sup>53</sup> Stuart Luman, *Berkeley’s New Urban Agriculture Ordinance Encourages Residents to Grow Their Own Food*, Berkeleyside (Aug. 27, 2018), <https://www.berkeleyside.org/2018/08/27/berkeley-urban-agriculture-law>.

<sup>54</sup> *Id.*

<sup>55</sup> City of Berkeley, *Berkeley Climate Action Plan*, (June 2, 2009), <https://berkeleyca.gov/your-government/our-work/adopted-plans/berkeley-climate-action-plan>.

<sup>56</sup> Berkeley Municipal Code 23.318.050.



- A. Zoning Certificate. When all of the thresholds in Section [23.318.040](#) (Thresholds) are met, the use is considered Low-Impact Urban Agriculture (LIUA) and is allowed by right with a Zoning Certificate.
- B. Administrative Use Permit. When one or more of the thresholds in Section [23.318.040](#) (Thresholds) are not met, the use is considered High-Impact Urban Agriculture (HIUA) requires an AUP. (Ord. 7787-NS § 2 (Exh. A), 2021)

#### Thresholds (23.318.040)

The levels of discretion for urban agriculture are based on the following thresholds:

- A. Maximum parcel size of 7,500 square feet.
- B. Maximum lot coverage of 20 percent for accessory structures and buildings.
- C. Maximum group classes and workshops of 20 participants per class conducted no more than three times per week.
- D. Hours of operation from 8:00 a.m. to 8:00 p.m., including but not limited to activities related to gardening and planting of horticultural crops, group classes, and sales.
- E. Use of organic pesticides. (Ord. 7787-NS § 2 (Exh. A), 2021)

#### Operation Standards (23.318.050)

- Performance Standards. The growing, production, or sale of urban agricultural products may not involve hazardous materials or processes or create offensive or objectionable noise, vibration, odors, heat, dirt, or electrical disturbance perceptible by a person beyond the lot line of the subject lot.
- Sales and Donations.
  - Sales and/or donations of urban agricultural products grown and produced on-site are permitted.
  - If selling or donating urban agricultural products to the public, the urban agriculture use shall comply with all applicable food safety laws, including the California Health and Safety Code.
- Garbage and Compost.
  - Garbage and compost receptacles must be screened from the street and adjacent properties by utilizing landscaping, fencing, or storage structures and all garbage shall be removed from the site weekly.
  - Compost piles and containers must be set back at least 10 feet from residential buildings when an urban agriculture use abuts a residential use.
- Farm Equipment. Use of mechanized farm equipment is not permitted in Residential Districts and when the urban agriculture use abuts a residential use, with the following exceptions:
  - Heavy equipment may be used initially to prepare the land for agriculture use.
  - Landscaping equipment designed for household use is permitted.
  - Equipment when not in use must be enclosed or otherwise screened from sight. (Ord. 7787-NS § 2 (Exh. A), 2021)

#### FISCAL IMPACTS OF RECOMMENDATION

Fiscal impacts include staff time for analysis.

### RATIONALE FOR RECOMMENDATION

Food insecurity rates in the Bay Area are worrying. Food shortages, natural disasters, and global conflicts further threaten the availability and economic accessibility of healthy food. The increasingly intense impacts of climate change create heightened cause for concern. Therefore, to create a food safety net in the City of Berkeley, it is necessary to implement FARM.

While FARM is not intended to replace conventional food retailing, it should produce enough food to supplement the normal food supply during times of distress. Reaching this quantity requires a coordinated effort and collaboration with experts in the field of urban agriculture, including small businesses and nonprofit organizations. Therefore, the Office of Economic Development should research incentives for these entities to partner with the City of Berkeley to design and implement a food utility pilot.

### OUTCOMES AND EVALUATION

This food resilience initiative is expected to address food insecurity for the City's population and maintain that security in the event of environmental and economic shocks.

### Contributors

Leanne Gluck, Project Director, Agriculture Innovation  
John Ikerd, Professor Emeritus of Agricultural Economics  
Ben Cadranel, Development Officer  
Ian Richards, Agricultural Technology Consultant

### CONTACT PERSON

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### ATTACHMENTS

1. Photographs of Urban Farming Installations
2. IBEW Local Union 595 Letter of Support
3. NECA Letter of Support

# Attachment 1



# Attachment 2



## IBEW Local Union 595

International Brotherhood of Electrical Workers  
Established in 1907 - Over 100 Years of Service

GREG BONATO  
Business Manager  
Financial Secretary

March 8, 2023

Berkeley Mayor and City Council  
City of Berkeley  
2180 Milvia Street  
Berkeley, California 94704

**RE: Support for Berkeley Food Utility and Access Resilience Measure (FARM)**

Dear Honorable Mayor and City Council:

On behalf of IBEW Local Union 595, we are writing to express our support for the Berkeley Food Utility and Access Resilience Measure (FARM). This council item is intended to protect food access for the people of Berkeley in times of natural and economic disaster.

Thousands of people in Berkeley are food insecure, and many more are on the threshold of food insecurity. Berkeley is already in a precarious position, and natural disasters and economic downturns threaten to thrust even more households into food insecurity. The COVID-19 pandemic brought to light the fragility of our food supply. In 2020, the pandemic caused worker shortages and layoffs across industries, increasing the prices of staple foods, reducing the availability of staple foods, and reducing consumers' budgets to afford these foods. The combination of these factors caused the demand for food aid in Berkeley to increase sharply. To meet demand, the Berkeley Food Network, a local organization that supplies food to those in need, was forced to *triple* its operations in the first half of 2020 alone. Because threats to food access are growing increasingly common due to climate change, it is vital to safeguard our community *before* a disruption to our food supply occurs.

FARM is a preemptive initiative that mitigates the danger of food disruption at multiple levels of the supply chain. At its core, FARM creates a local food production network to supplement the existing supply chain. This network creates and connects local food sources, including community farms and urban agriculture facilities. Further, FARM protects this network from disasters by integrating a renewable energy system that can operate despite disruptions to the main power grid. FARM aligns with the State of California's emergency preparedness vision and federal agencies' disaster preparedness initiatives.

We strongly support this item and respectfully request the Mayor and City Council favorably consider the Berkeley Food Utility Access and Resilience Measure.

Respectfully,

A handwritten signature in black ink that reads "Greg Bonato".

Greg Bonato  
Business Manager-Financial Secretary

GB:klp/opeiu#29/af-cio

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# Attachment 3



National Electrical Contractors Association

March 9, 2023

Berkeley Mayor and City Council  
City of Berkeley  
2180 Milvia Street  
Berkeley, California 94704

**RE: Support for Berkeley Food Utility and Access Resilience Measure (FARM)**

Dear Honorable Mayor and City Council:

On behalf of the Northern California Chapter of the National Electrical Contractors Association (NECA), we are writing to express our support for the Berkeley Food Utility and Access Resilience Measure (FARM). This council item is intended to protect food access for the people of Berkeley in times of natural and economic disaster.

Thousands of people in Berkeley are food insecure, and many more are on the threshold of food insecurity. Berkeley is already in a precarious position, and natural disasters and economic downturns threaten to thrust even more households into food insecurity. The COVID-19 pandemic brought to light the fragility of our food supply. In 2020, the pandemic caused worker shortages and layoffs across industries, increasing the prices of staple foods, reducing the availability of staple foods, and reducing consumers' budgets to afford these foods. The combination of these factors caused the demand for food aid in Berkeley to increase sharply. To meet demand, the Berkeley Food Network, a local organization that supplies food to those in need, was forced to *triple* its operations in the first half of 2020 alone. Because threats to food access are growing increasingly common due to climate change, it is vital to safeguard our community *before* a disruption to our food supply occurs.

FARM is a preemptive initiative that mitigates the danger of food disruption at multiple levels of the supply chain. At its core, FARM creates a local food production network to supplement the existing supply chain. This network creates and connects local food sources, including community farms and urban agriculture facilities. Further, FARM protects this network from disasters by integrating a renewable energy system that can operate despite disruptions to the main power grid. FARM aligns with the State of California's emergency preparedness vision and federal agencies' disaster preparedness initiatives.

We strongly support this item and respectfully request the Mayor and City Council favorably consider the Berkeley Food Utility Access and Resilience Measure.

Sincerely,

Greg E. Armstrong  
Executive Director  
Northern California Chapter, NECA

