GROWING UP IN THE BIG CITIES: PLANNING FOR THE FUTURE OF URBAN AGRICULTURE

BY

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The landscape of urban food production is changing. Urban agriculture is a broad term that includes a wide variety of economic and social activities related to the cultivation, processing, and distribution of agricultural products in urban and peri-urban areas. Traditionally, urban agriculture takes the form of home gardens, raised soil beds, hoop houses, and community gardens located in urban areas, where growing conditions remain subject to the natural surrounding environment including soil conditions, sunlight, and climate (this type of urban agriculture can be referred to as "traditional UA"). More recently, technological advancements have led to newer growing methods where plants are placed in soilless controlled environments that are isolated from those natural conditions. Coined "controlled environment agriculture" (CEA), this form of urban agriculture relies on a combination of plant science and environmental control techniques to optimize plant growth inside an enclosed space (usually indoors), in which the producers use technology and data to maintain ideal growing conditions. Unlike most traditional urban agriculture, controlled environmental agriculture is usually a highly-capitalized, commercial form of production that does not originate at the individual household or community level.

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Urban agriculture provides environmental, economic, social, and health benefits to the communities in which it is located, and traditional UA has a longer track record of creating these positive effects for communities than does CEA. Cities around the United States are using a variety of tools and planning measures to promote urban agriculture and reap the rewards of these benefits for their communities. These planning strategies, though, mostly support only traditional UA or are otherwise not designed to account for CEA, despite fundamental differences from traditional UA.

CEA is a promising new form of urban agriculture that will likely become a mainstay in urban environments in the near future. However, for CEA to have a lasting impact, it must achieve tangible benefits for urban communities like its traditional counterpart. Municipalities with an interest in growing CEA could do so by utilizing the various legal and real estate-related planning tools already used to support traditional UA. But even though traditional UA and CEA both fall under the "urban agriculture" label, using these tools in the same way may be ineffective. Rather, municipalities should consider these two forms of urban agriculture separately when using these regulatory tools because the practical functions of these forms of agriculture are very different, and because each form will have its own unique relationships with urban communities. Indeed, regulators should exercise caution when designing programs that support CEA because of its shorter history when compared to traditional UA, and because of the unknowns surrounding how CEA could contribute to negative community effects like gentrification and displacement.

Previous scholars have examined the impact of urban agriculture on community economic development generally, and have critiqued it for its links to gentrification and displacement on urban communities. Other scholars have examined, through community stakeholder interviews, the tension in certain cities between longstanding traditional UA practices and the introduction of certain forms of CEA. This Article is the first to examine CEA, consider its potential impacts on community economic development, and provide insight into how cities can approach the introduction of CEA into their urban frameworks while being cautious of its potential for negatively impacting existing communities.

I. INTRODUCTION

Behind the unremarkable exterior of an old factory warehouse in Brooklyn, New York is a surprising find: a sophisticated aquaponic production system that grows food indoors.[1] VertiCulture raises tilapia fish alongside vertical walls of vegetables in a symbiotic system, using the nutrient-enriched water from the fish to grow the plants in a soilless environment under artificial lights.[2] VertiCulture then sells both the fish and vegetables to customers in the city.[3] Meanwhile, less than two miles away, is the Bedford-Stuyvesant Community Garden—a traditional outdoor urban garden featuring raised planting beds where local gardeners grow vegetables, herbs, and fruit in soil and share their

[1] Shervin Abdolhamidi, *10 of the Most Unique Urban Farms in NYC,* UNTAPPED N.Y., https://perma.cc/VU8N-YUWH (last visited Nov. 14, 2023).
[2] *Id.*
[3] *Id.*

harvest with the community.[4] The juxtaposition of these separate facilities, all within the same borough of New York City, hints toward an exciting future for urban agriculture, in which urban food production can take various forms and serve different purposes. It also begs a few questions: do cities currently plan for these different forms of urban agriculture? Are there benefits to encouraging these different forms of urban agriculture? What happens if regulators do (or do not) address these different forms of urban agriculture in their legal landscapes? This Article will answer these questions and provide insight into how cities can incorporate novel forms of urban agriculture into their legal frameworks.

Urban agriculture is a broad term that includes a wide variety of economic and social activities related to the cultivation, processing, and distribution of agricultural products in urban and peri-urban areas.[5] Traditionally, this includes home gardens, raised soil beds, hoop houses, and community gardens located in urban areas,[6] where growing conditions remain subject to the natural surrounding environment such as soil conditions, sunlight, and climate. For purposes of this Article, this type of urban agriculture will be referred to as "traditional UA." Recently, technological advancements have led to newer growing methods where plants grow in soilless controlled environments isolated from those natural conditions. Coined "controlled environment agriculture" (CEA),[7] this form of urban agriculture relies on a combination of plant science and environmental control techniques to optimize plant growth inside an enclosed space (usually indoors), in which the producers use technology and data to maintain ideal growing conditions.[8] Unlike most traditional urban agriculture, controlled environmental agriculture is usually a highly-capitalized, commercial form of production that does not originate at the individual household or community level.[9]

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[4] *Bedford-Stuyvesant Community Garden*, N.Y. RESTORATION PROJ., https://perma.cc/A4M6-8F4U (last visited Nov. 14, 2023); *see also Controlled Environment Agriculture: Energy*, CORNELL COLL. AGRIC. & LIFE SCIS., https://perma.cc/7V53-WCE4 (last visited Nov. 14, 2023) (explaining aquaponic agricultural systems).

[5] *See, e.g.*, Tatiana Z. Pawlowski, Comment, *From Food Deserts to Just Deserts: Expanding Urban Agriculture in U.S. Cities Through Sustainable Policy*, 26 J. AFFORDABLE HOUS. & CMTY. DEV. L. 531, 534–535 (2018); RAYCHEL SANTO ET AL., JOHN HOPKINS CTR. FOR A LIVABLE FUTURE, VACANT LOTS TO VIBRANT PLOTS: A REVIEW OF THE BENEFITS AND LIMITATIONS OF URBAN AGRICULTURE 5 (2016), https://perma.cc/9E92-K8DZ.

[6] *See* Michael Carolan, *Digital Urban Agriculture as Disparate Development: The Future of Food in Three U.S. Cities Through the Lens of Stakeholder Perceptions, Networks, and Resource Flows*, 45 WM. & MARY ENV'T L. & POL'Y REV. 637, 637 (2021) [hereinafter Carolan, *Digital Urban Agriculture*] (describing traditional forms of urban agriculture).

[7] NASA Spinoff, *NASA Research Launches a New Generation of Indoor Farming*, NAT'L AERONAUTICS & SPACE ADMIN. (Nov. 23, 2021), https://perma.cc/98UF-WNPD.

[8] *Id.*

[9] *See id.* (explaining that CEA operations often rely on private investment to become profitable).

Urban agriculture provides environmental, economic, social, and health benefits to communities, and, as described below, traditional UA has a longer track record of creating these positive effects for communities than does CEA.[10] With urban agriculture's recent growth in popularity, cities around the United States are using a variety of tools and planning measures to promote urban agriculture and reap these rewards for their communities.[11] For the most part, though, these planning strategies primarily focus on supporting traditional UA or fail to consider CEA, despite the fundamental differences between the two.[12]

CEA is a promising new form of urban agriculture that will undoubtedly become a mainstay in urban environments in the near future.[13] However, CEA must achieve tangible benefits for urban communities like its traditional counterpart in order to have a lasting impact.[14] Municipalities interested in expanding CEA could do so by utilizing the various legal and real estate-related planning tools already used to support traditional UA. But even though traditional UA and CEA both fall under the "urban agriculture" label, using these tools in the same way may be ineffective. Because the practical functions of these forms of agriculture are vastly different, and because each has its own unique relationships with urban communities, municipalities should instead consider traditional UA and CEA separately when using these regulatory tools. Compared to traditional UA, the effect of CEA on surrounding communities is less understood. Indeed, regulators should exercise caution when designing CEA programs to prevent inadvertently contributing to gentrification and displacement.

Previous scholars have critiqued urban agriculture for its impacts on local communities, which can include gentrification and displacement of urban residents.[15] Other scholars have highlighted, through community stakeholder interviews, the tension in certain cities between longstanding traditional UA practices and the introduction of CEA.[16]

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[10] Wylie Goodman & Jennifer Minner, *Will the Urban Agricultural Revolution Be Vertical and Soilless? A Case Study of Controlled Environment Agriculture in New York City*, 83 LAND USE POL'Y 160, 160–61, 171 (2019).

[11] Pawlowski, *supra* note 5, at 552–53.

[12] *Id.* at 541–43.

[13] *See infra* Part II.C.

[14] *See* ANU RANGARAJAN & MOLLY RIORDAN, THE PROMISE OF URBAN AGRICULTURE: NATIONAL STUDY OF COMMERCIAL FARMING IN URBAN AREAS 65 (2019), https://perma.cc/QB5Y-PG8G.

[15] *See, e.g.*, Nathan McClintock, *Cultivating (a) Sustainability Capital: Urban Agriculture, Ecogentrification, and the Uneven Valorization of Social Reproduction*, 108 ANNALS OF THE AM. ASS'N OF GEOGRAPHERS 579, 580 (2018); Megan Horst et al., *The Intersection of Planning, Urban Agriculture, and Food Justice: A Review of the Literature*, 83 J. AM. PLAN. ASS'N 277, 283 (2017); Margot Pollans & Michael Roberts, *Setting the Table for Urban Agriculture*, 46 URB. LAW. 199, 218–22 (2014).

[16] *See* Carolan, *Digital Urban Agriculture*, *supra* note 6 (analyzing the tension between traditional UA and CEA through interviews with community stakeholders—e.g., urban farmers, CEA investors, local food power brokers, planners—located in Denver, CO, New York City, NY, and San Francisco, CA).

This Article is the first to examine CEA, consider its potential impacts on community economic development, and provide insight into how cities can approach the introduction of CEA into their urban frameworks while being cautious of CEA's potentially harmful effects.

Part II of this Article begins by describing traditional UA and CEA and explaining the relationship that typically exists between each form of urban agriculture and the surrounding community. Part II also discusses the direct and potential impacts of traditional UA and CEA on these communities, as well as urban agriculture's links to gentrification and displacement. Part III then covers the different legal and planning tools municipalities use to regulate and promote urban agriculture and how cities frequently design these policies with traditional UA in mind. Finally, Part IV examines how to apply these tools to CEA and proposes recommendations for how cities can use these tools, with caution, to promote CEA while being mindful of its potential impacts.

Cities interested in encouraging CEA can update their zoning codes to directly address CEA, while also specifically incorporating CEA concepts into their comprehensive planning efforts. These municipalities may also collaborate with governmental departments adjacent to urban agriculture (such as a governmental office pursuing environmental or sustainability goals in the region) to better understand the positive and negative impacts of CEA on their local communities. Cities can also collaborate with non-governmental organizations whose efforts can make CEA more widely accessible in urban environments. Finally, cities can design programs that provide economic-related incentives to encourage CEA projects to support their communities.

II. URBAN AGRICULTURE: TRADITIONAL PRACTICES AND THE FUTURE OF CONTROLLED ENVIRONMENT AGRICULTURE

Urban agriculture is a broad term, including a wide variety of economic and social activities related to the cultivation, processing, and distribution of agricultural products in urban and peri-urban areas,[17] the commodities of which can range from plant produce (i.e., vegetables and fruits) to livestock and their byproducts.[18] Urban agriculture operations may be privately, publicly, or commercially owned, and can encompass a wide variety of production formats.

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[17] Peri-urban areas are those areas outside of urban centers resulting from sprawl and suburban development, but are not fully rural nor fully urban. Rather, these areas are "dynamic transition zones between the city and countryside, display diverse land uses and uneven development, and operate under many different jurisdictions." Houman Saberi, *Stuck in the Middle With You: Peri-urban Areas and the Food System*, JOHNS HOPKINS CTR. FOR A LIVEABLE FUTURE (May 16, 2016), https://perma.cc/DM4T-Y4FT.

[18] *See, e.g.*, *Urban Agriculture*, U.S. DEP'T OF AGRIC., https://perma.cc/FUQ9-BKWB (last visited Dec. 10, 2023); Pollans & Roberts, *supra* note 15, at 210, 221. This Article will focus on only on urban agriculture as it relates to plant produce.

A. Traditional UA Explained

Traditionally, urban agriculture constituted in-soil farming practices where growing conditions were subject to natural environmental factors.[19] Traditional UA often involves individuals, communities, or commercial enterprises cultivating home gardens, community gardens, and urban farms to grow agricultural products,[20] largely relying on soil-based systems such as ground-level gardens, raised beds, hoop houses, or greenhouses.[21] Many of these projects began at the grassroots level to address economic, social, and food security issues in communities.[22] Traditional UA projects are typically labor-intensive, require relatively low starting investment costs,[23] and are especially prevalent in post-industrial cities where there is an abundance of vacant lots and property values are low.[24]

B. Controlled Environment Agriculture (CEA) Explained

More recently, technological advancements have ushered in new methods of urban agriculture where growers place farming inputs in a controlled environment isolated from natural conditions. By using technology and data, CEA maintains ideal growing conditions for the desired output.[25] CEA is a broad term, consisting of a wide array of growing techniques including, but not limited to, indoor growing installations that use artificial lighting and soilless growing mediums like hydroponic,[26] aeroponic,[27] and aquaponic[28] systems.[29] Unlike

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19 *See* Carolan, *Digital Urban Agriculture*, *supra* note 6, at 637.

20 Community gardens are an often-cited example of traditional UA and are defined as lots "typically . . . divided among households who tend small plots of land for their own use." Kate H. Brown & Andrew L. Jameton, *Public Health Implications of Urban Agriculture*, 21 J. PUB. HEALTH POL'Y 20, 21 (2000).

21 *See* Jessica Owley & Tonya Lewis, *From Vacant Lots to Full Pantries: Urban Agriculture Programs and the American City*, 91 U. DET. MERCY L. REV. 233, 234 (2014); *see also* Carolan, *Digital Urban Agriculture, supra* note 6, at 637.

22 *See* MAHBUBUR R. MEENAR ET AL., INT'L SOC'Y OF CITY & REG'L PLANNERS, URBAN AGRICULTURE IN POST-INDUSTRIAL LANDSCAPE: A CASE FOR COMMUNITY-GATHERED URBAN DESIGN 3 (2012), https://perma.cc/77XS-BN7F (citing Gerda R. Wekerle, *Food Justice Movements: Policy, Planning, and Networks*, 23 J. PLAN. EDUC. & RSCH. 378 (2004); Thomas Macias, *Working Toward a Just, Equitable, and Local Food System: The Social Impact of Community-Based Agriculture*, 89 SOC. SCI. Q. 1086 (2008)).

23 Carolan, *Digital Urban Agriculture*, *supra* note 6, at 637.

24 *See* MEENAR ET AL., *supra* note 22, at 3. While more prevalent in post-industrial cities, traditional UA is still found in larger, more densely populated cities such as New York City. *See* discussion *supra* note 16 (describing a study examining traditional UA in Denver, New York City, and San Francisco).

25 NASA Spinoff, *supra* note 7.

26 Hydroponics is the process of growing plants "without soil and with minimal water" by housing plant seeds and their roots in "shallow channels," and "circulating a constant film of water that contains all the nutrients the plants require." *Id.*

27 "Aeroponics is the process of growing plants in an air/mist environment without the use of soil or an aggregate media." J.M. Clawson et al., *Aeroponics for Spaceflight Plant*

traditional UA, CEA projects often rely on software and automation, requiring less physical labor and higher financial investments to start.[30] CEA can exist in many forms, including small-scale hydroponic systems in schools, large-scale commercial growing systems inside buildings, moveable shipping containers outfitted with these technologies, and rooftop greenhouse structures that leverage CEA technologies alongside natural sunlight.[31] As a result, CEA systems are often most appropriate for densely populated cities with high land values, low land vacancy, and stronger economies because of their ability to use less space more efficiently through vertical and horizontal growing techniques.[32]

C. CEA is Here to Stay

The increased demand for local agricultural products and the mounting pressure on the current agricultural system caused by climate change and global population growth make the introduction and growth of CEA in urban and peri-urban areas in the United States nearly inevitable. Currently, CEA's high operating costs present a challenge to this growth, but these costs will shrink as CEA technology continues to advance.[33]

In recent years, urban agriculture has grown in cities across the United States, due in part to consumers' increased interest in buying

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Growth, *NASA—Review of Aeroponics*, AEROPONICS DIY (2000), https://perma.cc/D5GE-LFVT.

[28] Aquaponics is a process combining "aquaculture (producing fish for human consumption) with hydroponics using" nitrogen and waste produced by the fish "to provide some of the nutrients the plants require." *Controlled Environment Agriculture: Energy*, *supra* note 4.

[29] NASA Spinoff, *supra* note 7.

[30] *See* Michael Carolan, *Urban Farming Is Going High Tech, Digital Urban Agriculture's Links to Gentrification and Land Use*, 86 J. AM. PLAN. ASS'N 47, 47 (2020) [hereinafter Carolan, *Urban Farming is Going High Tech*] ("[T]he standard definition of urban agriculture . . . incorporates elements of automation, software, and/or silicon-based hardware into their operations."); Carolan, *Digital Urban Agriculture*, *supra* note 6, at 636–37 ("DUA, as defined here . . . help[s] distinguish between those systems that are more labor-intensive/less capital-intensive and those in possession of the opposite characteristics, namely, lower labor requirements but higher levels of capital investments . . . .").

[31] *See, e.g.*, Khadija Benis & Paulo Ferrão, *Commercial Farming Within the Urban Built Environment—Taking Stock of an Evolving Field in Northern Countries*, 17 GLOB. FOOD SEC. 30, 31–32 (2018) (discussing building-integrated agriculture and farming in shipping containers); SANTO ET AL., *supra* note 5, at 9 (discussing rooftop gardens and greenhouses, as well as indoor and vertical farms).

[32] *See* Pawlowski, *supra* note 5, at 552–53, 572; *see also* Goodman & Minner, *supra* note 10, at 171 (explaining that CEA farms in cities with high land values and densities are best sited on building roofs or inside the built environment, while ground-level hydroponic greenhouse production could be a viable alternative in cities where land values are low).

[33] *See* Alyssa Fuller, *Vertical Farming: A Resource-Conscious Tool for Community Transformation*, BIPARTISAN POL'Y CTR. (May 10, 2021), https://perma.cc/V72D-XKSZ.

local and sustainable foods.[34] CEA, like traditional UA, offers an additional way to meet this increased demand. CEA, though, is far more scalable than traditional UA[35] and could reach even more consumers desiring local produce than traditional UA could.

According to the United States Department of Agriculture, climate change presents a significant threat to the rural American agriculture system—many farms across the country are experiencing disruptive impacts to their operations due to "shifting weather patterns and increasingly frequent and severe storms, floods, drought and wildfire."[36] A sustainable and climate resilient source of agricultural products, CEA presents a solution to supplement a vulnerable agricultural system.

Finally, experts predict that the world's population will swell to more than nine billion people by the year 2050, with urban centers experiencing the highest population growth.[37] The current rural agriculture system may struggle to feed such a large population without exhausting essential resources and jeopardizing future production.[38] CEA, which does not use soil and other traditional farming inputs, will play a significant role in helping feed the planet's future generations.[39]

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[34] Sarah Schindler, *Unpermitted Urban Agriculture: Transgressive Actions, Changing Norms, and the Local Food Movement,* 2014 WIS. L. REV. 369, 371–72 (2014); *see also* Michael Pollan, *The Food Movement, Rising*, N.Y. REV. (June 10, 2010), https://perma.cc/P3DN-BFX2 ("What is attracting so many people to the [local food] movement today . . . is about something more than food. The food movement is also about community, identity, pleasure, and, most notably, about carving out a new social and economic space removed from the influence of big corporations on the one side and government on the other.").

[35] Many CEA practices are inherently more efficient when compared to industrial farming practices, as vertical "hydroponic and aquaponic growing systems allow plants to take in nutrients at a much higher rate and produce faster growth," and allow for year-round food production because indoor farming practices are not subject to climate change and seasonal environmental conditions. Clint Simpson, *Updating the Building Code to Include Indoor Farming Operations*, J. FOOD L. & POL'Y, Fall 2019, at 1, 5–6.

[36] *See Climate Solutions,* U.S. DEP'T OF AGRIC., https://perma.cc/5263-EJEL (last visited Nov. 21, 2023).

[37] NASA Spinoff, *supra* note 7.

[38] *See id.*

[39] *See id.* ("These practices could help feed Earth's burgeoning future generations, said Nate Storey, chief science officer at Plenty Unlimited Inc., one of several companies building on NASA plant-growth research with an eye toward bringing agriculture into the urban environment."); *see also* Redmond Ramin Shamshiri et al., *Advances in Greenhouse Automation and Controlled Environment Agriculture: A Transition to Plant Factories and Urban Agriculture*, 11 INT'L J. AGRIC. & BIOLOGICAL ENG'G 1, 12 (2018) ("The fast growth of global population is changing the food production systems to keep up with the growing demands. Agricultural innovation and research in the past three decades, combined with the advances in information technology have introduced promising cultivation techniques that are valuable for sustainability and economic viability of CEA . . . . The concepts in UA and the associated facilities have received significant attention . . . and are growing to meet the needs of the ever-developing urban life.").

One major challenge to the widespread integration of CEA facilities is high operating costs that can bring CEA profitability into question.[40] Among the factors contributing to high operating costs are the disputed energy efficiency of CEA facilities[41] and labor costs.[42] However, as CEA technology continues to advance, these operating costs will likely come down and the potential for the economic viability of these systems will increase.[43]

D. CEA and Traditional UA Compared

Although they share agricultural production as a common core feature, CEA and traditional UA require different growing conditions, location requirements, capital investments, labor inputs, and community connections. However, CEA and traditional UA face similar challenges when it comes to the availability of urban space for their operations.

The fundamental difference between traditional UA and CEA is the growing environment. Traditional UA home gardens, community gardens, and commercial operations rely on yards, green spaces, or vacant lots to grow produce on the ground on a *horizontal* plane.[44] By comparison, CEA facilities are often located indoors and grow plants more efficiently by using horizontal *and vertical* planes.[45] Further, CEA systems require less water, pesticides, and herbicides than soil-based

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[40] *See, e.g.*, Benis & Ferrão, *supra* note 31, at 35; Nicholas Engler & Moncef Krarti, *Review of Energy Efficiency in Controlled Environment Agriculture*, 141 RENEWABLE & SUSTAINABLE ENERGY REV. 1, 6 (2021).

[41] CEA technologies that grow produce indoors without any natural sunlight rely on LED-lighting, which can be energy inefficient, often used for sixteen to eighteen hours per day (or run 24/7), and therefore can lead to high operating costs and a higher carbon footprint impact than expected. However, rooftop hydroponic greenhouse systems using CEA technologies will avoid the environmental downfalls associated with using artificial lighting. *See* Goodman & Minner, *supra* note 10, at 162.

[42] Engler & Krarti, *supra* note 40, at 4–5.

[43] For example, while lighting used to grow plants is usually the highest operating cost for CEA facilities, recent technological advances have been able to achieve the desired agricultural output with greater energy efficiency by integrating new lighting practices, such as using red and blue LED lights vs. traditional white LED lights to grow plants. *See generally id.*; *see also* Fuller, *supra* note 33 ("As renewable energy becomes more affordable, the prospect of incorporating it into vertical farms becomes more economically feasible. Vertical farming companies . . . are already applying this strategy into their current and prospective farms, with [one company] announcing its intention to power [a new] facility using 100% renewable energy. LED lighting is also projected to be up to 70% more energy efficient by 2030.").

[44] *See, e.g.*, Kurt Benke & Bruce Tomkins, *Future Food-Production Systems: Vertical Farming and Controlled-Environment Agriculture*, 13 SUSTAINABILITY: SCI., PRAC. & POL'Y 13, 21–22 (2017) (noting that vertical farming can achieve greater production volumes than horizontal farming).

[45] *Id.* at 15.

farms,[46] and CEA operators can meticulously control the growing environment and inputs.[47] Meanwhile, traditional UA requires soil and remains vulnerable to natural environmental factors.

Another major difference is the distribution of capital and labor inputs. CEA technology, operating costs, and capital investments can add up to millions in startup capital for commercial operations.[48] On the other hand, traditional UA projects often begin as "less-capitalized operations socially embedded within area neighborhoods."[49] Moreover, automation in CEA systems can reduce or eliminate the need for the manual labor tasks typically required by traditional UA like seeding, planting, watering, and picking produce.[50] Meanwhile, CEA project operators are generally paid positions requiring high-tech skills or STEM-related education.[51]

Finally, traditional UA often aims to build a sense of community within urban areas,[52] while many CEA facilities are commercial ventures pursuing economic goals. CEA operators are frequently disconnected from local nonfinancial organizations when compared to traditional UA systems[53] and play a lesser role in engaging local neighborhoods and revitalizing communities.[54] However, CEA systems still can serve community interests by creating local jobs, increasing the availability of fresh food, and revitalizing post-industrial buildings that might otherwise go unused.[55]

For both CEA and traditional UA, the limited availability of suitable urban land is one of the greatest barriers to the implementation and sustainability of city farming.[56] The cost of urban land can make it incredibly difficult for traditional UA to be sustainable at any scale.[57] CEA operators are similarly challenged with finding suitable locations for indoor vertical farms or rooftop installations.[58] The challenges for

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[46] For example, indoor farms can reduce water use by up to 90% when compared to traditional agricultural methods. Simpson, *supra* note 35, at 5 (citing Kheir Al-Kodmany, *The Vertical Farm: A Review of Developments and Implications for the Vertical City*, 8(2) BUILDINGS, no. 24, Feb. 2018, at 2); *see also* Goodman & Minner, *supra* note 10, at 161; SANTO ET AL., *supra* note 5, at 9–12.

[47] *See, e.g.*, RANGARAJAN & RIORDAN, *supra* note 14, at 10, 61.

[48] Carolan, *Urban Farming Is Going High Tech*, *supra* note 30, at 49 ("It has been estimated, for instance, that a 30,000-ft^2 digital farm growing leafy greens and herbs in the tristate area around New York City needs roughly $4 million in startup capital." (citation omitted)).

[49] Carolan, *Digital Urban Agriculture*, *supra* note 6, at 661.

[50] *See* Carolan, *Urban Farming Is Going High Tech*, *supra* note 30, at 49.

[51] *See id.* at 49; *see also* Goodman & Minner, *supra* note 10, at 167.

[52] *See, e.g.*, SANTO ET AL., *supra* note 5, at 4.

[53] Carolan, *Digital Urban Agriculture*, *supra* note 6, at 661.

[54] *See* RANGARAJAN & RIORDAN, *supra* note 14, at 64.

[55] *See id.*

[56] *See, e.g.*, Horst et al., *supra* note 15, at 277, 284; RANGARAJAN & RIORDAN, *supra* note 14, at 2; Jeffrey Yuen, *City Farms on CLTs: How Community Land Trusts are Supporting Urban Agriculture*, LAND LINES, Apr. 2014, at 2, 3.

[57] *See* SANTO ET AL., *supra* note 5, at 16–17.

[58] *See id.* at 17–18.

CEA, though, include the expenses and limitations associated with retrofitting the existing built environment with new CEA-related technologies[59] and the competition from other building uses, such as rooftop solar energy systems.[60] Further, the lack of readily available information on building infrastructure, rooftop sunlight, and utility availability—all factors relevant to a successful CEA system—pose another challenge to a CEA operator seeking a suitable location for their facilities.[61]

E. Community Impacts of Traditional UA and CEA

Scholars have thoroughly scrutinized the impacts of urban agriculture on community economic development. This analysis has revealed numerous positive community impacts, including increasing food access and health benefits, building educational opportunities for practical skills and creating jobs, and developing community and social capital.[62] On the other hand, urban agriculture has faced criticism for its negative impacts on communities, chiefly its connections to gentrification and displacement.[63] Although they differ in how they

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[59] *See* Kathrin Specht et al., *Urban Agriculture of the Future: An Overview of Sustainability Aspects of Food Production In and On Buildings*, 31 AGRIC. HUMAN VALUES 33, 47–48 (2014).

[60] *See* SANTO ET AL., *supra* note 5, at 18.

[61] *See* Goodman & Minner, *supra* note 10, at 170.

[62] *See, e.g.*, SANTO ET AL., *supra* note 5, at 1, 4 (providing a comprehensive analysis of various documented sociocultural, health, environmental, and community economic development benefits associated with urban agriculture generally, while also framing these benefits within the risks and limitations linked with urban agriculture); Mahbubur R. Meenar & Brandon M. Hoover, *Community Food Security Via Urban Agriculture: Understanding People, Place, Economy, and Accessibility from a Food Justice Perspective*, 3 J. AGRIC., FOOD SYS., & CMTY. DEV. 143, 144–46 (2012) (discussing how urban agriculture has taken root in many cities as a response to problems associated with food insecurity that resulted from the lack of physical and economic access to safe and nutritious foods that meet the dietary needs and cultural preferences of people of all socio-economic and racial backgrounds in urban communities); Horst et al., *supra* note 15, at 281–84 (examining various community economic development benefits associated with urban agriculture such as increased food access security, improved health, economic enrichment, skill and job building opportunities, and enhancing community and social development); Jeffrey P. LeJava & Michael J. Goonan, *Cultivating Urban Agriculture—Addressing Land Use Barriers to Gardening and Farming in Cities*, 41 REAL EST. L. J. 216, 218–24 (2012); Specht et al., *supra* note 59, at 43–45.

[63] *See, e.g.*, Horst et al., *supra* note 15, at 283 (explaining how modern urban agriculture is sometimes "dominated by already advantaged communities, despite urban agriculture's historic association with diverse populations, including poor households, immigrants, and communities of color"); SANTO ET AL., *supra* note 5 at 7, 17–18 (acknowledging that urban agriculture projects are not panaceas of social inclusion or equity, explaining how many inner-city populations are wary of external public or private efforts to "improve" their neighborhoods through urban agriculture, and advocating for practitioners to first understand the various contexts in which urban farms and gardens are situated in order to challenge and prevent exclusionary and discriminatory policies and practices that often manifest in their operations); Pollans & Roberts, *supra* note 15, at 217–22.

manifest, these positive and negative community impacts have been associated with both traditional UA and CEA.

1. Food Access and Health

First, by providing an additional source of fresh food, traditional UA benefits communities by increasing food access and security.[64] Traditional UA allows households to save money by supplementing their usual food supplies with home- or community-grown produce,[65] and many traditional UA farmers will grow produce beyond their own consumption needs and share excess products with the wider community.[66] Additionally, traditional UA participants tend to eat more fresh fruit and vegetables, engage in physical activities through gardening, and enjoy improved mental health and well-being.[67]

CEA is often touted as a way to address food insecurity by delivering fresh food to low-income, urban communities through the use of modern, climate-resilient technologies.[68] Examples of the potential for increased food security from CEA include operators supplying fresh food to communities during climate disasters,[69] partnerships between CEA operators and cities aimed at supplying food to community institutions in need,[70] and reports of community and institutional CEA farms (i.e.,

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[64] *See* SANTO ET AL., *supra* note 5, at 11.

[65] *See id.* at 14 (discussing various research studies, including one study of a San Jose, California home-gardening support program for low-income, working poor and long-term unemployed residents where 88% of participants reported saving over $240/year /household (citing Leslie Gray et al., *Can Home Gardens Scale Up into Movements for Social Change? The Role of Home Gardens in Providing Food Security and Community Change in San Jose, California,* 19 LOC. ENV'T 187, 195–96 (2014)); *see also* Horst et al., *supra* note 15, at 281 (explaining research results supporting that families in Seattle, Washington who participate in community gardening can typically offset 30% to 40% of their fresh produce needs (citing Hagey, Rice, & Flournoy, 2012)).

[66] Horst et al., *supra* note 15, at 281 (citing an example of a community garden in Baltimore, MD, where half of the gardeners donated their produce, "earning the garden a reputation among food-insecure neighbors as a place to get free food").

[67] SANTO ET AL., *supra* note 5, at 11–12; *see also* Pawlowski, *supra* note 5, at 540.

[68] *See, e.g.*, Benis & Ferrão, *supra* note 31, at 30–32; Specht et al., *supra* note 59, at 43; *see also*, Sarah Federman & Paul M. Zankowski, *Vertical Farming for the Future*, U.S. DEP'T OF AGRIC. (Aug. 14, 2018), https://perma.cc/26KY-NDGM (explaining how urban vertical farming (a form of CEA) could help meet global growing food demands and how the USDA created funding opportunities to support future vertical farming research).

[69] Because of its indoor, climate resilient facilities, Gotham Greens, a rooftop CEA operator in New York City, was the only local fresh food supplier in the city during the 2012 Hurricane Sandy climate crisis that left open-air traditional UA producers vulnerable. *See* Al-Kodmany, *supra* note 46, at 21.

[70] AeroFarms, a CEA operator in Jersey City, New Jersey, is partnering with the city in a World Economic Forum initiative to create greater access to food in the city's communities. *See AeroFarms Partners To Launch First Vertical Farming Program Addressing Food Deserts, Inequity with Food Access & Education*, AEROFARMS (June 12, 2020), https://perma.cc/3TEG-UZML. The program will consist of 10 vertical farms throughout Jersey City located in senior centers, schools, public housing complexes, and municipal buildings, will grow 19,000 pounds of vegetables annually using CEA, and will provide

projects located at schools, hospitals, etc.) providing a wider range of produce to low-income consumers.[71]

However, while CEA operators market their products as sustainable local options,[72] there is little evidence indicating CEA operators significantly contribute to local food security through the regular sale of their produce.[73] Unlike traditional UA farms, which often begin with community-focused goals, CEA farms are primarily profit-driven and might fail at providing food accessibility, especially for lower-income residents, because these operators must sell their products at higher prices due to the steep CEA operating costs.[74] Relatedly, commercial CEA farms tend to grow more expensive types of produce marketed at higher prices for wealthy consumers, such as lettuce or basil, instead of growing more nutritional produce priced for low-income residents, such as spinach and kale.[75] As a result, CEA operators may have little impact on increasing food security and expanding food access in underserved communities.

2. Education and Opportunities for Jobs and Building Skills

Second, traditional UA provides opportunities for skill-building and education for community members. Whether informal community gardens or commercial urban farms, traditional UA projects can serve as hubs for learning agricultural skills and trainings related to "science, environmental stewardship, cultural heritage, and healthy eating."[76] Further, the general skills learned by community members engaged in traditional UA can support the job-readiness of community members outside of the agricultural sector.[77] Learned skills, such as leadership and project management, are especially significant for youth and socially disadvantaged members of these communities.[78]

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food to the public for free. *Id.*; *see also Jersey City Vertical Farming Program to Open in Two Public Housing Locations, Targeting Most Vulnerable Residents*, CITY OF JERSEY CITY (Feb. 24, 2021), https://perma.cc/XP88-577A; Resolution of the City of Jersey City, N.J., Res. 21-150, Feb. 24, 2021 (resolution setting aside space for vertical gardens).

71 Goodman & Minner, *supra* note 10, at 163, 169.

72 *See* RANGARAJAN & RIORDAN, *supra* note 14, at 63.

73 *See* SANTO ET AL., *supra* note 5, at 15.

74 *See id.*; *see also* Benis & Ferrão, *supra* note 31, at 35.

75 *See* Goodman & Minner, *supra* note 10, at 169 (explaining how the low nutritional value produce grown at commercial CEA farms in New York City "contributes only minimally to the goal of elected officials supportive of UA to increase New Yorkers' consumption of healthy fruits and vegetables").

76 *See* SANTO ET AL., *supra* note 5, at 6; Horst et al., *supra* note 15, at 282.

77 *See* SANTO ET AL., *supra* note 5, at 6; Horst et al., *supra* note 15, at 282; *see also* LeJava & Goonan, *supra* note 62, at 221 ("The implementation of urban agriculture can also economically aid a city by providing job training and internships for the young and unemployed.").

78 *See* SANTO ET AL., *supra* note 5, at 6. ("[U]rban agriculture initiatives can support the job readiness and workforce integration of neighborhood youth, immigrants, differently abled people, and those who were formerly incarcerated, although the spectrum beyond agriculture-specific skills must be emphasized to encourage general job readiness.").

CEA can benefit surrounding communities by providing community members with unique skills, education, and new job opportunities. Like traditional UA, CEA facilities can function as teaching spaces, contribute to environmental education, and provide opportunities for practical training in agricultural-related practices.[79] Students in schools and universities across the country are actively involved in CEA activities,[80] learning about these farming systems and how to operate them in an educational setting.[81] Additionally, CEA facilities might offer a source of employment in communities when they require a mix of skilled labor, such as low-skilled workers who seed, harvest, and pack produce and highly skilled and educated workers who design and operate the CEA systems.[82]

Because many of the job opportunities created by CEA require technical skill and advanced degrees,[83] these roles may not be accessible to community members where these facilities are located, especially if a CEA facility is in a disadvantaged community or a neighborhood with lower levels of education among residents. Further, innovation in CEA technologies may actually reduce the need for low-skill jobs in the long run, as increased automation in CEA systems may replace the manual labor needed for these tasks.[84]

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[79] *See* Specht et al., *supra* note 59, at 44; *see also* Al-Kodmany, *supra* note 46, at 17 (explaining how FarmedHere, a CEA operator in Chicago, Illinois hires local youths through a local urban agriculture-training program targeted to underserved youths).

[80] *See* RANGARAJAN & RIORDAN, *supra* note 14, at 66.

[81] *See id.* at 62; *see also* Goodman & Minner, *supra* note 10, at 164 (estimating that "some form of CEA programming is available at approximately four percent of New York City's 1,878 public elementary and/or middle schools and 11 percent of its 400 public high schools."); *see also About Us: The University of Arizona's Controlled Environment Agriculture Center (UA-CEAC)*, CONTROLLED ENV'T AGRIC. CTR., https://perma.cc/9K65-PS9Y (last visited Nov. 20, 2023) (describing the center's goals of developing CEA technologies and educating students in these disciplines); *see also* Cornell CEA Team, *About CEA*, CONTROLLED ENV'T AGRIC., https://perma.cc/EUW8-QZCY (last visited Nov. 20, 2023) (explaining how Cornell's CEA program provides leading academic research in CEA and collaborates with public entities to contribute to the growing field of CEA).

[82] *See* RANGARAJAN & RIORDAN, *supra* note 14, at 61; Benke & Tomkins, *supra* note 44, at 22; *see also* Al-Kodmany, *supra* note 46, at 28 ("Building a vertical farm requires a multi-disciplinary team of architects, engineers, scientists, farmers, horticulturists, environmentalists, marketers, and economists. . . . As such, the vertical farm offers new exciting careers in biochemistry, biotechnology, construction, maintenance, marketing, engineering, and research and development opportunities for improving the involved technologies." (citation omitted)).

[83] Benke & Tomkins, *supra* note 44, at 22.

[84] CEA professionals and directors from Cornell University's CEA program reflect that "automation of tasks like seeding can improve efficiencies and decrease costs," meaning "some CEA companies can justify the higher one-time cost of labor-automating machines to save on labor costs down the line, ultimately lowering operating costs." RANGARAJAN & RIORDAN, *supra* note 14, at 62; *see also* Al-Kodmany, *supra* note 46, at 14 tbl.2 ("Fully automated growing systems with automatic SMS text messaging would require manual labor only for on-site planting, harvesting, and packaging.").

3. Social Development

Third, urban agriculture is widely praised for its positive impact on communities through social development. Traditional UA serves to build social bonds and cultural capital by bringing together community members from diverse backgrounds to collaborate with each other on shared farming activities.[85] Traditional UA can transform vacant lots into beautiful gardens and green common spaces for the community.[86] Community gardens serve as gathering places for neighbors to build social networks, share cultures, and interact beyond only agricultural functions.[87] Commercial traditional UA farms promote social welfare in communities by contributing to economic security and sustainability, empowering small business owners and entrepreneurs, and creating greater opportunities for interpersonal connections within the community.[88] Traditional UA also empowers community members to challenge structural inequities unrelated to urban agriculture by teaching organizers social and political skills.[89]

There is little evidence indicating CEA farms contribute to social development within communities. On the one hand, operators may pilot CEA projects at local schools and support secondary school training for CEA jobs in urban areas.[90] However, community access to CEA production facilities is limited because of the operators' needs to control growing conditions and keep leave them closed to the public. CEA facilities are private commercial enterprises rather than public gathering spaces.[91] Further research is needed to consider how CEA projects can create positive social effects within communities.

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[85] *See, e.g.*, Horst et al., *supra* note 15, at 282; Jane E. Schukoske, *Community Development Through Gardening: State and Local Policies Transforming Urban Open Space*, 3 N.Y.U. J. LEGIS. & PUB. POL'Y 351, 357 (2000) ("The community gardening movement promotes interaction between the diverse residents of an urban neighborhood along common interests such as beautification, local food production, personal safety, health, and group projects.").

[86] *See* Kate A. Voigt, *Pigs in the Backyard or the Barnyard: Removing Zoning Impediments to Urban Agriculture*, 38 B.C. ENV'T AFFS. L. REV. 537, 544–45 (2011); KATHERINE H. BROWN & ANNE CARTER, CMTY. FOOD SEC. COAL.'S N. AM. URB. AGRIC. COMM., URBAN AGRICULTURE AND COMMUNITY FOOD SECURITY IN THE UNITED STATES: FARMING FROM THE CITY CENTER TO THE URBAN FRINGE 7 (2003).

[87] SANTO ET AL., *supra* note 5, at 4.

[88] *See* RANGARAJAN & RIORDAN, *supra* note 14, at 2.

[89] *See* SANTO ET AL., *supra* note 5, at 6. For example, as one group of women gardeners in Detroit gained social empowerment through community gardening, this served as an entry point for discussing how community members "might gain . . . access to affordable housing, clean water, community policing, and decent public education." *Id.*; *see also* Horst et al., *supra* note 15, at 283 (describing a group of gardeners at the South Central Farm in Los Angeles who drew on organizing skills learned from community gardening to become advocates for social justice in city decision-making).

[90] *See* RANGARAJAN & RIORDAN, *supra* note 14, at 64.

[91] *See id.*

4. Gentrification and Displacement

Despite some praise, urban agriculture also receives criticism for its association with gentrification and community displacement. Gentrification is the process by which new affluent residents move into previously disinvested urban areas following elements of urban renewal, such as infrastructure improvements and cultural and social growth.[92] This influx of wealthier residents causes land values to increase over time, in turn driving development and the transformation of these areas for "better uses" with higher economic values; the higher prices then force the existing, less affluent community members to relocate.[93] Relatedly, "green gentrification" is the same gentrification process resulting from new "green" infrastructure improvements like parks, greenways, restored waterways, and urban agriculture, which often follow environmental agendas initiated by policymakers, municipal planners, developers, and other drivers of urban growth.[94]

While traditional UA projects initially began in distressed communities to combat food and wage insecurity, these projects now often signal the transformation of devalued neighborhoods through gentrification.[95] Urban agriculture projects can function as the infrastructure improvements that drive green gentrification, making "affordable neighborhoods more attractive to economically mobile newcomers, which . . . increases the cost of living" and leads to the displacement of residents and the disruption of existing agricultural projects.[96]

As these forces take hold, they predictably can have negative impacts on communities. While traditional UA can stabilize neighborhoods and capitalize on disinvestment by putting vacant land to good use, these projects may only serve as a temporary use of that land—"a placeholder until [a better] investment opportunity arises."[97]

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92 *See, e.g.*, McClintock, *supra* note 15, at 580; Horst et al., *supra* note 15, at 283; Carolan, *Digital Urban Agriculture*, *supra* note 6, at 642.

93 *See, e.g.*, McClintock, *supra* note 15, at 580; Horst et al., *supra* note 15, at 283; Carolan, *Digital Urban Agriculture*, *supra* note 6, at 642.

94 *See* McClintock, *supra* note 15, at 580–81 (using the term "ecogentrification"); *see also* Etienne Toussaint, *Black Urban Ecologies and Structural Extermination*, 45 HARV. ENV'T L. REV. 447, 471–72 (2021).

95 McClintock, *supra* note 15, at 580.

96 Horst et al., *supra* note 15, at 283.

97 Carolan, *Digital Urban Agriculture*, *supra* note 6, at 639; *see also* Horst et al., *supra* note 15, at 284 ("[U]rban agriculture is typically considered a temporary use of land only . . . with little protection from replacement by other future uses. Conflicts will always exist between the people who are actively gardening a space and those who stand to gain economically from a different use, particularly when the land is not permanently protected for urban agriculture and when the income that can be made from food cultivation is significantly less than what can be made from doing something else on the property."); McClintock, *supra* note 15, at 580 ("A clear connection exists between the gentrification of these [UA projects] and the proliferation of restaurants and grocery stores that capitalize on the mainstreaming of 'foodie' culture and the value it places on local, organic consumption.").

Land insecurity in particular makes community agriculture projects especially vulnerable to gentrifying forces that seek to convert their gardens into alternate land-uses.[98]

As these neighborhoods change, farm projects may not be razed, but instead taken over or organized by new residents or outsiders, which can further marginalize community members. As newcomers move into these communities, they get to enjoy the long-term benefits associated with the established traditional UA projects, rather than the previous residents.[99] Further, many commercial traditional UA programs producing local goods may discard local culinary traditions and preferences by defining "local" based on the place of production instead of what the community actually wants to eat, marginalizing the local community from these goods.[100] These products can be prohibitively expensive, creating further economic disparity between those who can afford to enjoy these products, like outsiders and newer residents, and disadvantaged groups who may not be able to afford them.[101]

CEA has not existed for nearly as long as traditional UA, but it may also have the potential to contribute to gentrification and marginalization in urban communities. Like traditional UA, CEA could lead to green gentrification, especially if it fuels urban renewal by providing food options targeted at more affluent consumers. Because of CEA's high operation costs and production-driven commercial nature, operators must sell CEA produce at higher prices inaccessible to much of the urban population, widening further the fresh food access gap for low-income communities.[102] Similarly, CEA businesses frequently sell their produce at high-end retailers like Whole Foods Markets, local specialty retail stores, and restaurants, which can create physical distance between CEA produce and urban communities in need.[103]

These concerns highlight how green infrastructure improvements, like urban agriculture, can displace or marginalize existing residents as land values rise and these neighborhoods are transformed for "better

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98 Horst et al., *supra* note 15, at 284, 286–87 ("There are hundreds of examples of urban agriculture practitioners witnessing the destruction of their gardens, typically when the land became amenable to a higher profit use."); Toussaint*, supra* note 94, at 471–72 ("[N]eoliberal urban agriculture that provides privileged access to vacant lots to a limited entrepreneurial class erases the urban poor from the city altogether through gentrification . . . . By ignoring the lack of collective ownership of the commons during the construction of green projects . . . low-income residents are further disconnected from the land in their neighborhood."); SANTO ET AL., *supra* note 5, at 17 ("Some operations on city-owned land have been granted land under the agreement that no permanent changes to the site may be made, thereby restricting the long-term scalability, efficiency, and sustainability of urban agriculture.").

99 Horst et al., *supra* note 15, at 283.

100 Pollans & Roberts, *supra* note 15, at 219–20.

101 *Id.* at 220.

102 *See* Benis & Ferrão, *supra* note 31, at 35 (discussing the high costs of commercial farming systems); Specht et al., *supra* note 59, at 45–46.

103 RANGARAJAN & RIORDAN, *supra* note 14, at 64.

uses" with higher economic values.[104] Further, public and private actors driving economic growth often incorporate urban agriculture into their environmental goals to justify economic development with environmental stewardship.[105] Accordingly, public development agendas could unintentionally contribute to gentrification and displacement resulting from urban agriculture. A familiarity with the municipal planning and policy efforts supporting urban agriculture is imperative to understanding how CEA can fit into the larger urban development picture and how CEA might affect existing communities once integrated.

III. MUNICIPAL TOOLS USED TO REGULATE URBAN AGRICULTURE

Until the early 2000s, most municipal planning and policy efforts concerning urban agriculture focused only on enabling community gardening or animal husbandry, without broader, more holistic efforts to develop urban agriculture.[106] Over the past two decades however, city planners have recognized urban agriculture's potential contribution to broader social goals like sustainability, environmental stewardship, and food security and have strengthened municipal efforts to support urban agriculture through food system planning and policymaking.[107] Most of these recent efforts, however, focus primarily on how municipalities can support *traditional UA* in their planning agendas,[108] with less emphasis on how *CEA* can also fit into the urban agriculture picture.[109]

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104 Toussaint, *supra* note 94, at 471–72.

105 *See* McClintock, *supra* note 15, at 580–81 (discussing the selective incorporation of environmental goals by growth-oriented coalitions).

106 *See* Madeline R. Halvey et al., *Beyond Backyard Chickens: A Framework for Understanding Municipal Urban Agriculture Policies in the United States*, 103 FOOD POL'Y 1, 2 (2021) (discussing the increased popularity in traditional urban agriculture).

107 *Id.* at 2; *see also* Horst et al., *supra* note 15, at 285 (discussing the evolution of food systems planning and policymaking since 2000).

108 *See, e.g.*, Halvey et al., *supra* note 106, at 2 (referencing regulation of the quantity and type of animals and structures permitted, soil safety standards, and if and how food may be sold, as well as the development of UA-specific plans); Neil D. Hamilton, *Greening Our Garden: Public Policies to Support the New Agriculture*, 2 DRAKE J. AGRIC. L. 357, 366 (1997) (discussing recent interest in urban agriculture, specifically in community gardens); Pollans & Roberts, *supra* note 15, at 209–10 (describing positive changes to zoning codes promoting urban agriculture, such as removing impediments to the sale of home-grown produce and legalizing various forms of keeping livestock); David Grapentine, *The Latest Trends in Urban Agriculture*, 19 DRAKE J. AGRIC. L. 327, 337–41 (2014) (discussing obstacles to urban agriculture and describing some of the most significant concerns for prospective urban agriculturists being how livestock practices and gardening are often not adequately addressed in municipal codes). These articles also discuss commercial forms of urban agriculture, but not with respect to CEA.

109 *See, e.g.*, Sorell E. Negro & Jean Terranova, *The Birds and the Bees: Recent Developments in Urban Agriculture*, 47 URB. LAW. 445, 445–47 (2015) (discussing examples of new zoning laws and amendments that promote urban agriculture by permitting more home and community gardens, while also highlighting other city efforts to enable hydroponic and rooftop urban agriculture).

Accordingly, policymakers often overlook or do not clearly address CEA, leaving CEA operators uncertain about how their practices fit within the existing urban legal framework.[110]

Municipalities use various planning tools to regulate urban agriculture. These tools include creating new or amending existing zoning codes and ordinances, expanding comprehensive planning programs by incorporating urban agriculture goals into their policy agendas, creating or collaborating with municipal departments working on policy issues adjacent to urban agriculture, collaborating with non-governmental organizations promoting urban agriculture, and securing or incentivizing urban agriculture using public resources.[111] These tools can support urban agriculture but, because of the fundamental differences between CEA and traditional UA, applying them to CEA projects requires careful consideration.

A. Zoning Regulations

In the United States, the most common form of land-use regulation is zoning: the process by which municipalities regulate the development of public and private property within municipal borders.[112] Initially established as "Euclidean Zoning,"[113] cities have the power to create distinct districts within city boundaries and to prescribe the use of public and private land in each of those districts—such as districts for only residential, commercial, industrial, or manufacturing purposes.[114] By strictly segregating urban land solely based upon intended use, however, cities create a scarcity of available property in the urban

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110 *See* Carolan, *Digital Urban Agriculture*, *supra* note 6, at 663 (discussing CEA as a "gray area" in the context of zoning changes to accommodate urban agriculture).

111 *See* Nina Mukherji & Alfonso Morales, *Zoning for Urban Agriculture*, ZONING PRAC.: AM. PLAN. ASS'N, Mar. 2010, at 3–4 (discussing several planning and programmatic efforts, including collaborative "food policy councils"); Pawlowski, *supra* note 5, at 552–58 (summarizing various types of policy and regulatory tools that have emerged in recent years to support urban agriculture development); Halvey et al., *supra* note 106, at 2–3 (describing indirect governance approaches centered on complex collaborative partnerships between state and local government and non-governmental actors). *See generally* MINDY GOLDSTEIN ET AL., URBAN AGRICULTURE: A SIXTEEN CITY SURVEY OF URBAN AGRICULTURAL PRACTICES ACROSS THE COUNTRY 4 (2011) https://perma.cc/7PR8-C3QG (discussing how sixteen cities have incorporated urban agriculture into their zoning ordinances and land use plans).

112 *See* John R. Nolon, *Historical Overview of the American Land Use System: A Diagnostic Approach to Evaluating Governmental Land Use Control*, 23 PACE ENV'T L. REV. 821, 829–30 (2006) (discussing the rapid spread of comprehensive zoning laws throughout the United States and the modern era of zoning).

113 This segregated use regulation became known as "Euclidian Zoning" once the U.S. Supreme Court upheld this local governmental exercise of power as constitutional. *See Euclid v. Ambler Realty Co.*, 272 U.S. 365, 397 (1926) (reasoning that municipalities have an interest in protecting public health and safety and therefore could use zoning to balance these public interests against private land use).

114 *See* Nolon, *supra* note 112, at 830–31.

interior because of the inability to combine urban land uses.[115] Although Euclidean Zoning is still the dominant municipal planning mode today, mixed-use zoning—a planning approach that combines multiple different uses into the same districts—is gaining traction because it offers a solution to the scarcity of available land.[116]

Municipalities implement certain rules within each zoning district, including building heights and sizes; the amount and areas of a lot available for development; and the permitted, conditional, and prohibited uses for a property.[117] Zoning regulations today determine whether four main categories of activities, or "uses," are permitted in a zoned area: 1) as an as-of-right use, (also known as a primary use)—one that does not require a permit or other governmental approval; 2) as an accessory use—one that compliments an as-of-right use and can only occur with those uses; 3) as a conditional use—one that requires city approval of the activity through a permitting process before the activity is allowed on the property; or 4) as an explicitly prohibited use.[118]

Because zoning regulations control how land may be used in any given area of a city, including determining whether urban agriculture activities are permitted or prohibited altogether, they significantly impact the legitimization and promotion of urban agriculture.[119] While cities use zoning to encourage urban agriculture in various ways, most only directly regulate traditional UA.[120] Traditional UA zoning regulations typically outline whether urban agriculture is permitted as a primary, accessory, or conditional use, or completely prohibited.[121] Relatedly, cities may also create definitions of urban agricultural uses that spell out different activities and then distinguish which districts permit which activities, such as allowing community gardening in

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115 *See, e.g.*, Nicolas M. Kublicki, *Innovative Solutions to Euclidean Sprawl*, 31 ENV'T L. REP. 11001, 11002 (2001); Eliza Hall, *Divide and Sprawl, Decline and Fall: A Comparative Critique of Euclidean Zoning*, 68 PITT. L. REV. 915, 920–23 (2007).

116 *See* Pollans & Roberts, *supra* note 15, at 207–08; *see also* Tyler Adams, *Chapter 3.4 Transit-Oriented Development: Mixed-Use Zoning*, SUSTAINABLE DEV. CODE, https://perma.cc/7733-LZ2X (last visited Nov. 18, 2023) ("The emergence of sustainability and walkability as important factors in community development has led to a resurgence of mixed-used zoning.").

117 *See* Nolon, *supra* note 112, at 831. Within each zoning district, each parcel of land is typically assigned at least one as-of-right land use, and uses that are typically associated with those principal uses, called accessory uses, are also designated. *Id.* at 830. Landowners may obtain variances to these rules, enlarging their rights to use their property for other uses, by proving the zoning standards impose unnecessary hardships. *Id.* Prohibited uses are those that do not conform to the zoning regulations. *Id.*

118 83 AM. JUR. 2D *Zoning & Planning* § 129 (2023) (defining "permitted use"); 83 AM. JUR. 2D *Zoning & Planning* § 133 (2023) (defining "accessory use"); 83 AM. JUR. 2D *Zoning & Planning* § 135 (2023) (defining "conditional use").

119 *See* Pawlowski, *supra* note 5, at 556–57.

120 *See id.* at 557.

121 *See* LeJava & Goonan, *supra* note 62, at 243.

certain districts, while only permitting commercial urban agriculture in others.[122]

B. Comprehensive Plans

State enabling acts authorize most municipal governments in the United States to plan for and regulate land use within their jurisdictions.[123] To do this, municipal governments adopt comprehensive plans—formal policies that local governments and regional authorities use to manage future development.[124] Within these comprehensive plans, cities adopt broad goals and directives covering all facets of urban development and identify specific strategies and actions they can use to accomplish these goals.[125]

Municipal planners use comprehensive plans to support urban agriculture by identifying specific urban agriculture-related strategies under larger policy goals and mapping out how to implement these strategies and actions.[126] Comprehensive plans often expressly support only traditional UA by situating specific traditional UA-related strategies and actions within broad policy goals related to the environment, the economies of urban communities, and health and food security.[127]

Notably, to respond to potential social inequity concerns associated with urban development, some municipalities are employing an "equity

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[122] *See id.* at 233 (explaining how Jersey City allows "community gardening, rooftop gardens and raised planters in all zones and redevelopment plan areas of the city" on an as-of-right basis and allows commercial UA in "commercial, industrial and mixed use redevelopment plan area zones" (citing Resolution of the City of Jersey City, N.J., Res. 11-041, Apr. 13, 2011)).

[123] ZONING AND LAND USE CONTROLS, CH. 37: THE COMPREHENSIVE OR MASTER PLAN § 37.01 (2023), LexisNexis MB.

[124] *See, e.g.*, PRACTICAL LAW GOVERNMENT PRACTICE, COMPREHENSIVE PLANS: OVERVIEW (2023), Westlaw ("Local governments and regional authorities utilize comprehensive plans to define and manage future development in their jurisdictions.").

[125] *See* Pawlowski, *supra* note 5, at 558 (noting that cities can adopt broad comprehensive plans to implement incrementally); Horst et al., *supra* note 15, at 278 (discussing planners' role in supporting food justice through strategic long term planning efforts).

[126] *See* Pawlowski, *supra* note 5, at 558; *see* Horst et al., *supra* note 15, at 278. For example, Minneapolis 2040 is a Comprehensive Plan that is used to guide the city's decision making over the next few decades, and among its many broad goals include two associated with urban agriculture—"[h]ealthy, safe, and connected people," and "[c]lean environment." "Urban [a]griculture and [f]ood [p]roduction" is named as a policy topic in furtherance of these two goals, and the plan outlines thirteen specific actions the city can take to support this policy, such as: "[f]acilitat[ing] expansion of urban agriculture and distribution of fresh food in the city," "[s]upport[ing] urban agriculture innovations that improve environmental systems and health," and "[c]ontinu[ing] support for existing community gardens and urban agriculture." *See Urban Agriculture and Food Production: Support and Promote Urban Agriculture and Local Food Production*, MINNEAPOLIS 2040, https://perma.cc/7TA2-KELD (last visited Nov. 21, 2023).

[127] *See, e.g.*, Horst et al., *supra* note 15, at 285, 287 (describing how Seattle's comprehensive plan included a goal to establish a community garden for every 2,500 residents).

lens" in their comprehensive planning efforts and using this lens for urban agriculture planning.[128] This tool is an additional step in the decision-making process that examines the impacts of policy, funding, and program decisions on communities, and guides decision makers "through a series of questions about the historic and existing social inequities related to the topic, their strategies for consulting with disadvantaged communities, likely impacts of various proposals on disadvantaged communities, and whether structural barriers to overcoming disparities can be better addressed."[129] Thus, these tools allow planners to better anticipate the effects that comprehensive planning decisions might have on existing communities and to make planning decisions accordingly.

C. Collaboration with Urban Agriculture Adjacent Government Department

Another way cities are supporting urban agriculture is by establishing new, or by empowering existing, governmental departments and offices with policy objectives adjacent to urban agriculture, such as departments responsible for implementing food access, environmental, or sustainability policies, such as an "Office of Sustainability and Environment."[130] These departments are already in a position to direct efforts towards urban agriculture-related initiatives and implement relevant policies that serve the city's complimentary goals, like enriching health and food systems and the environment.[131]

Often, these offices will assess the urban agriculture environment in the city, publish reports documenting these existing resources, and develop plans to promote urban agriculture in their local communities.[132] Because these offices work on a micro level to engage with communities—as opposed to the macro level of comprehensive planning across the jurisdiction—they can create targeted urban agriculture-specific initiatives linked to the office's policy-related

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[128] *See id.* at 289.

[129] *Id.* (citing Marisa Zapata, *Creating an Equity Lens at Institutions for Higher Education*, *in* SELECTED WORKS OF MARISA A. ZAPATA 1, 1–2 (2017)).

[130] *See* Mukherji & Morales, *supra* note 111, at 4; Pawlowski, *supra* note 5, at 555; *see also* LeJava & Goonan, *supra* note 62, at 231, 234–35 (describing how Seattle created an Office of Sustainability and Environment with food policy initiatives related to urban agriculture and describing how community gardens in New York City are regulated by the city's Department of Parks and Recreation).

[131] *See* Pawlowski, *supra* note 5, at 555–56 (describing several city departments that are well positioned to address urban agriculture issues because they are already tasked with developing environmental policy for the city); RANGARAJAN & RIORDAN, *supra* note 14, at 74 (noting many cities' efforts to create a Sustainability or Food Policy Director position that works with other city departments to advance urban agriculture and broader food sustainability and security objectives).

[132] *See* GOLDSTEIN ET AL., *supra* note 111, at 6, 16–17, 29, 34 (describing urban agriculture reports prepared by city-level environmental and sustainability offices in Chicago, Atlanta, Baltimore, Minneapolis, and Nashville); *see also* Pawlowski, *supra* note 5, at 555.

responsibilities such as sustainability or food security.[133] The scope of these offices differs depending on their responsibilities and can cover all dimensions of urban agriculture or only address one aspect. For example, they may work to promote traditional UA by working within the city to address community health concerns, promote local food initiatives, create zoning ordinances, and expand community gardening programs.[134] Alternatively, they might manage only community gardening agendas.[135] In any case, their work on the local level enables these offices to actively engage with urban communities.

D. Collaboration with Non-Governmental Organizations

Many cities also promote urban agriculture by supporting or relying on non-governmental organizations that provide in-kind resources, economic relief, technical assistance, and educational programs to communities engaging in urban agriculture.[136] These organizations vary, but can include non-profit organizations and community interest groups providing direct resources to neighborhood residents.[137] They may also take the form of policy-related groups, such as think tanks, food policy councils, food system alliances, and advocacy organizations.[138] Cities may partner directly with these organizations or rely on them to do the substantive legwork promoting urban agriculture policy initiatives.[139]

Because these organizations are separate from the government, they can have an even closer relationship with urban agriculture communities. For example, these organizations may assist farmers by providing traditional UA land resources to farming communities or by aiding farmers directly in acquiring land; alternatively, they may provide agricultural support resources like educational workshops,

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133 *See* Pawlowski, *supra* note 5, at 555 (explaining how the City of Atlanta, Georgia's Office of Sustainability created an initiative—Sustainable Atlanta—that established a plan for promoting urban agriculture by addressing health concerns, promoting local food initiatives and zoning ordinances, and expanding community gardening). Another example is the City of Baltimore's Office of Sustainability, which created an urban agriculture initiative called Homegrown Baltimore to increase the production, distribution, sales, and consumption of locally grown food within the city. *Homegrown Baltimore*, BALT. OFF. OF SUSTAINABILITY, https://perma.cc/8ADD-W7KF (last visited Nov. 15, 2023).

134 *See* Pawlowski, *supra* note 5, at 555 (describing the wide scope of urban agriculture responsibilities under Atlanta, Georgia's Office of Sustainability).

135 For example, the New York City Department of Parks & Recreation manages the city's GreenThumb program, which provides programming and material support to community gardens all over New York City but does not support urban agriculture initiatives otherwise. *About GreenThumb*, N.Y. CITY DEP'T OF PARKS & RECREATION https://perma.cc/Z26T-3MTF (last visited Nov. 15, 2023).

136 *See* Halvey et al., *supra* note 106, at 2.

137 *See id.*; Pawlowski, *supra* note 5, at 554–55.

138 *See* RANGARAJAN & RIORDAN, *supra* note 14, at 73.

139 Pawlowski, *supra* note 5, at 554.

garden tool banks, and other technical resources.[140] On the other hand, policy-focused organizations like think tanks and advocacy groups support urban agriculture by crafting urban agriculture-related polices and working with cities to adopt such policies.[141]

E. Securing or Incentivizing Urban Agriculture Using Public Resources

The legal framework promoting urban agriculture also includes local and regional programs that utilize public resources to provide security for, or to incentivize, urban agriculture. Accessing affordable, usable land for urban agriculture is a barrier to entry for many farmers as rising land values and expanding real estate development opportunities often threaten their hopeful land tenure.[142] Thus, many early initiatives adopted by cities focused on providing means to secure land for traditional UA farmers, such as making public lands available for farming; appropriating private, vacant lots and devoting them to traditional UA purposes; or entering lease or license agreements with new traditional UA farmers to use such lands for community gardens.[143] Newer initiatives for securing land for traditional UA include land banks[144] and land trusts,[145] which are legal vehicles that hold title to properties and make those lands available to communities for traditional UA.[146]

Economic and property tax incentives are among the latest policy initiatives aimed at incentivizing traditional UA and these incentives are especially useful "in neighborhoods with significant vacant land and little economic opportunity due to historic disinvestment and high poverty rates."[147] State and local governments offer tax incentives by

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[140] *See id.* at 554–55 (describing the work of Milwaukee's Urban Gardens Program and Baltimore's Community Greening Resource Network).

[141] RANGARAJAN & RIORDAN, *supra* note 14, at 73.

[142] *See id.* at 2.

[143] *See* Pollans & Roberts, *supra* note 15, at 211–12 (describing city programs, including Seattle's P-Patch program under which the city's Director of Neighborhoods can administer license and lease agreements for public land to be used as community gardens and market gardens); *see also* Pawlowski, *supra* note 5, at 553.

[144] Land banks are quasi-governmental entities created by counties or municipalities and authorized to acquire, manage, and repurpose vacant, abandoned, and foreclosed urban properties so these properties can be put back to productive use, including for community gardens and traditional UA farms. LeJava & Goonan, *supra* note 62, at 243–44.

[145] Land trusts are typically organized as non-profits and work to conserve land by acquiring it for the purpose of preserving its important ecological characteristics; some work with municipalities to secure land for urban agricultural activities. *Id.* at 244.

[146] *See id.* at 243–44; Pawlowski, *supra* note 5, at 554–55; RANGARAJAN & RIORDAN, *supra* note 14, at 74–75. For example, the City of Cleveland's Land Bank program is a recent effort designed to acquire vacant land and sell, lease, or license it to individuals, developers, and non-profits at very affordable rates for redevelopment purposes, one of which includes traditional UA. *Cleveland Land Bank,* CITY OF CLEVELAND, OHIO, https://perma.cc/3EDC-KNV4 (last visited Nov. 16, 2023).

[147] *See* RANGARAJAN & RIORDAN, *supra* note 14, at 72; *see also* Pollans & Roberts, *supra* note 15, at 211 (describing Maryland's 2010 urban agriculture tax credit program allowing

lowering property taxes for private property owners if those owners make their lands available for urban agricultural purposes.[148] Decisionmakers can structure these incentives to require long-term commitments to urban agriculture, so that landowners cannot take advantage of the favorable tax status and then use the property for other purposes when a different opportunity arises.[149]

IV. MUNICIPAL TOOLS USED TO REGULATE URBAN AGRICULTURE APPLIED TO CEA AND RECOMMENDATIONS

CEA is a promising new form of urban agriculture that will likely become a mainstay in urban environments in the near future.[150] However, CEA must achieve tangible benefits for urban communities like its traditional UA counterpart in order to have a lasting impact.[151] Cities depend on the planning tools discussed in Part III to support urban agriculture, but presently, these tools primarily cater to traditional UA or do not effectively address CEA. Municipalities with an interest in growing CEA could better leverage these tools to actively support the expansion of CEA. However, even though traditional UA and CEA both fall under the "urban agriculture" label, using these tools in the same way may be ineffective. Rather, municipalities should design urban agriculture planning initiatives to specifically account for CEA apart from traditional UA, because each has their own unique impacts on urban environments and local communities.[152] Finally, because CEA is largely uncharted territory compared to traditional UA, regulators should exercise caution when designing programs to support CEA to prevent inadvertently contributing to negative community effects like gentrification and displacement.

A. Zoning Regulations Applied to CEA

Zoning is the most influential planning tool for urban agriculture, as it dictates the permissibility or prohibition of urban agriculture

municipalities to grant property tax credits to urban agriculture properties of a certain size and California's 2013 Urban Agriculture Incentive Zones Act allowing cities to designate "urban agriculture incentive zones" where landowners can receive a property tax reduction for committing the land to agricultural use for a minimum of five years).

148 *See* RANGARAJAN & RIORDAN, *supra* note 14, at 72; *see also* Pollans & Roberts, *supra* note 15, at 211.

149 California's Urban Agriculture Incentive Zones Act is an example of a tax incentive program that requires landowners to enter into a contract committing their property to traditional UA uses for at least five years. *Urban Agriculture Incentive Zones Act*, CAL. STATE BD. OF EQUALIZATION, https://perma.cc/9QLQ-4HJY (last visited Nov. 24, 2023); *see also* Grapentine, *supra* note 108, at 336 (describing California's Urban Agriculture Incentive Zones Act).

150 *See supra* Part II.C.

151 *See* RANGARAJAN & RIORDAN, *supra* note 14, at 65.

152 *See supra* Part II.D.

activities within city limits. Cities interested in encouraging CEA should amend their zoning codes to define "urban agriculture" and to include terms related to CEA in the definition, so that practitioners and communities have clear guidance on permitted practices. Cities may also encourage CEA in different communities by removing practical zoning barriers to these operations. Finally, cities should allow CEA's different uses across various zoning districts to make it more accessible for commercial and individual purposes.

Two categories exist for urban agriculture zoning regulations: 1) those that clearly regulate traditional UA but which are unclear on CEA—or do not address it at all—and may or may not permit such practices; and 2) those that clearly regulate traditional UA and CEA separately.[153] The Milwaukee, Wisconsin zoning code is an example of a code that clearly regulates traditional UA but which may incidentally apply to CEA. Milwaukee's zoning code defines "[a]gricultural uses" to include "[c]ommunity gardens," "[r]aising livestock," "[p]lant nursery or greenhouses," and "[c]ommercial farming enterprise[s],"[154] all of which are defined further. While the community garden and livestock definitions explicitly contemplate traditional UA,[155] the "nursery or greenhouse" definition *could* encompass CEA due to the potential use of CEA technologies in greenhouse structures.[156] The "[c]ommercial farming enterprise" definition seems wide enough to include both traditional UA and CEA because the code defines this term as using "premises," rather than "land," for growing plants for commercial sale,[157] which if read broadly, could include indoor or controlled environment production. However, the code does not provide any further direction on these terms and only clearly permits traditional UA, leaving it unclear whether a "greenhouse" or "[c]ommercial farming enterprise" can use CEA at all.

Zoning codes that unambiguously regulate traditional UA and CEA separately are less common, and the Chicago, Illinois zoning code provides a great example. Chicago's code clearly defines some typical traditional UA uses like "community gardens."[158] The code, though, also

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153 MILWAUKEE, WIS., ZONING CODE § 295-203-14(a)–(d); CHI., ILL., ZONING ORDINANCE § 17-17-0103-F; *id.* § 17-17-0104-H(1)–(3).

154 MILWAUKEE, WIS., ZONING CODE § 295-203-14(a)–(d).

155 *Id.* § 295-203-14(c) ("Community garden" is defined as "us[ing] . . . land . . . for the growing of crops, plants or other vegetation by a group of individuals or by a public or non-profit organization."); *id.* § 295-203-14(b) ("Raising of livestock" is defined as "the use of land or buildings for aquaculture, or the keeping of . . . domesticated livestock if permitted by the health department.").

156 *Id.* § 295-203-14(a) ("Plant nursery or greenhouse" is defined as "an establishment engaged in growing crops of any kind within or under a greenhouse . . . .").

157 *Id.* § 295-203-14(d) ("Commercial farming enterprise" is defined as "premises used to grow and harvest plants or compost for sale . . . .").

158 CHI., ILL., ZONING ORDINANCE § 17-17-0103-F ("Community Garden" is defined as a "neighborhood-based development with the primary purpose of providing space for members of the community to grow plants for beautification, education, recreation, community distribution or personal use.").

defines "Urban Farm" broadly as "[g]rowing, washing, packaging and storage of fruits, vegetables and other plant products for wholesale or retail sales," and delineates within this term by defining *where* these activities may occur using the terms "Indoor Operations," "Outdoor Operations," and "Rooftop Operations."[159] Notably, the code defines "Indoor Operation" to include activities conducted completely within enclosed buildings and mentions typical operations include "greenhouses, vertical farming, hydroponic systems and aquaponic systems."[160] Chicago's zoning code leaves little room for ambiguity when it comes to CEA.

The lack of clear zoning information can either discourage city dwellers from engaging in urban agriculture or lead them to unknowingly violate these laws.[161] Cities intent on supporting CEA should amend their zoning codes to include property use definitions for "urban agriculture" and should specify whether its various permitted forms include traditional UA or CEA features. Like Chicago's zoning code, this might include precisely delineating terms like "commercial farm," "rooftop farm," "indoor farm," and "vertical farm." For even more granularity, cities could also define the features and accessories within these uses to include forms of CEA, like "hydroponics," "aeroponics," and "aquaponics." Crucially, amending a zoning code to specifically account for CEA would allow city planners to avoid the unintended consequences of a vague "urban agriculture" zoning definition, like inadvertently permitting a commercial CEA project to be built in a neighborhood that was designed for community gardening projects for residents.

Clarifying how zoning codes apply to CEA is also important for creating equity among all communities practicing urban agriculture. Where cities have not clearly defined CEA, CEA operators may not need to consider zoning issues in the same way that traditional UA operators do.[162] CEA farms are typically located entirely indoors or are otherwise not publicly visible[163] and therefore can avoid scrutiny for whether the facility complies with agriculture zoning laws. Further, CEA practitioners may not even consider their operations to be agriculture[164] and might ignore whether an area is zoned for urban agricultural use or not. This can create inequities for traditional UA farmers whose operations are publicly visible, leaving them with no choice but to comply with zoning regulations; in some cases, traditional UA farmers have even had to seek changes to zoning laws to accommodate their

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159 *Id.* § 17-17-0104-H(1)–(3).

160 *Id.* § 17-17-0104-H(1).

161 Pawlowski, *supra* note 5, at 544.

162 *See* RANGARAJAN & RIORDAN, *supra* note 14, at 69–70.

163 *Id.* at 70.

164 *See* Carolan, *Digital Urban Agriculture*, *supra* note 6, at 663 (describing an interview with a practitioner in San Francisco who recounted how CEA operators were allowed to operate in parts of the city not zoned for agriculture and an interview with a New York City real estate agent who contrasted CEA with traditional UA by explaining "[CEA] has more in common with Silicon Valley than . . . the Corn Belt").

gardens or operations.[165] By clarifying CEA within zoning laws and taking an active role in deciding how to regulate the future agricultural system, cities can avoid inequitable zoning that could unintentionally favor CEA over existing traditional UA practices in communities.

Zoning codes may also eliminate practical barriers to CEA that arise from limitations on building heights and sizes, as well as limitations on the amount and areas of the lot or building where structures can be built.[166] Recently, New York City amended its zoning ordinances to make rooftop urban agriculture more accessible.[167] When implementing the Zone Green amendment, the city explained how greenhouses on top of "industrial, commercial and school buildings can enable year-round local food production and provide valuable educational opportunities," but that development limitations on rooftop floor area and building height regulations constrained these opportunities.[168] Thus, the City Planning Commission proposed allowing rooftop greenhouses to be exempt from floor area and height limits to remove these structural barriers.[169] Because New York City is rich with urban farmers using rooftop greenhouses fitted with CEA technologies,[170] this change will make rooftop CEA projects even more accessible in the city.

Finally, mixed-use zoning regulations could make CEA more accessible to different communities by increasing the amount of property available for development in the urban interior through the expansion of possible permitted uses. For CEA, this could mean allowing buildings in commercial, industrial, and manufacturing zones to be used for commercial indoor farming and amending the zoning code to allow small-scale rooftop, indoor, and basement farming for persons and communities in residential districts. As CEA technology becomes more affordable and accessible, cities can make CEA facilities more accessible to a wider range of communities through mixed-use zoning.

Notably, though, any zoning decisions require caution because they will affect the location of CEA operations and may impact surrounding communities. For example, cities interested in creating greater food resources in food desert areas with little green space may seek to enact

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165 *See id.*

166 *See* Nolon, *supra* note 112, at 830 (explaining how zoning regulations establish various building construction rules).

167 *Zone Green Text Amendment,* N.Y.C. DEP'T OF CITY PLAN. (Apr. 30, 2012), https://perma.cc/2PNC-JYV2.

168 *Id.*

169 *Id.* (explaining that conditions for these exemptions include that the greenhouse be located on top of a building that does not contain residences or sleeping accommodations, that such greenhouses must not exceed twenty-five feet in height, that they must be set back six feet from the roof edge, and that they must include practical measures to limit water consumption).

170 *See* Goodman & Minner, *supra* note 10, at 167 (noting "[s]ix of New York City's Commercial CEA Farms are on roofs and rely primarily on sunlight, with supplemental lighting used as needed").

CEA-favorable zoning regulations in those areas. If expanding food access is the goal, though, such an effort must be done with intention to ensure that the food produced is accessible and affordable for that community. Comprehensive planning and coordination with municipal offices and non-governmental groups can help ensure the effective and beneficial implementation of these zoning decisions.

B. Comprehensive Planning Applied to CEA

Through comprehensive planning, municipal governments can implement city-wide development goals related to urban agriculture using the other tools discussed here, such as zoning changes, creating new offices, or incentivizing development. Because of their broad nature, comprehensive plans will often not address CEA directly, but will propose strategies related to urban agriculture generally. Cities interested in implementing CEA using planning tools should research the city's built environment resources and capacity for expanding CEA, specifically incorporate CEA concepts into their plans, and integrate an equity lens into their planning practices to better account for how CEA will impact communities.

Conducting surveys on the city's existing resources and researching capacity for urban agriculture are important tools for successful plan implementation[171] often used for supporting traditional UA. When explaining strategies for how the city could facilitate sustainable local food production in its comprehensive plan, Chicago noted that "[l]ocal governments should simplify and incentivize the conversion of vacant and underutilized lots, spaces, and rooftops into agricultural uses," and to support this effort, "[r]esearch groups should . . . develop . . . an inventory of underutilized publicly owned land that could be appropriate for urban agriculture."[172]

Similarly, cities do not inventory properties for existing and prospective CEA operations. However, the same researching techniques could support CEA by publicly documenting land and building features within city limits that contain factors integral to successful CEA systems, such as the stock of vacant or unused buildings, the infrastructure features within buildings (e.g. elevators, roof load), the rooftops' exposure to sunlight, and the utility availability within the built environment.[173] Doing so could help would-be CEA farmers understand the city's existing built environment resources and its capacity for supporting CEA operations. While a city may find it challenging to document this information alone, city leaders could identify this strategy within a comprehensive plan and work with city

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171 Pawlowski, *supra* note 5, at 558.

172 CHI. METRO. AGENCY FOR PLAN., GO TO 2040 COMPREHENSIVE REGIONAL PLAN 154 (2010), https://perma.cc/4BJS-G8H9.

173 *See* Goodman & Minner, *supra* note 10, at 170.

planners, governmental offices, and community groups to paint a better picture of CEA resources.

Although comprehensive plans are broad, cities can deliberately incorporate CEA concepts into their plans by including CEA within the actions or strategies supporting the broader goals of environmental sustainability, community support, and food policy, as they do with traditional UA. Minneapolis, Minnesota's 2040 plan, for instance, is used to guide the city's decision-making over the next few decades,[174] and among its broad goals are two associated with urban agriculture and food production—"[h]ealthy, safe, and connected people," and a "[c]lean environment."[175] The plan outlines thirteen specific actions the city can take to support urban agriculture under these goals, many of which are stated broadly but designed to aid traditional UA by supporting community gardens or providing land security.[176] Minneapolis's plan does not address CEA specifically, but does state some actions broadly enough to contemplate CEA, such as: "[e]xplore and support technical and design solutions for rooftop gardens" and "[s]upport tools, structures and processes used in urban agriculture and local food production, such as greenhouses, [and] infrastructure for extending growing seasons."[177]

A city interested in supporting CEA could take a similar approach with its comprehensive plan by incorporating CEA into the actions supporting its broad goals related to sustainability and food security. A city government could draft an even more specific plan than Minneapolis by directly referencing CEA, indoor farming, or similar practices within the actions or strategies carrying out these goals, alongside but separately from strategies supporting traditional UA. Planning authorities should focus on how creating CEA opportunities can supplement the food supply year-round, support potential tech-related job creation, and revitalize under-used built environment features; importantly, city planners should work to connect these potential rewards to the community and social development benefits inherent in traditional UA. To accomplish these actions under broad comprehensive plans, a city should work through internal departments and with external community enterprises to implement the actions identified in the plan.

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174 *Minneapolis 2040—The City's Comprehensive Plan*, MINNEAPOLIS 2040, https://perma.cc/H7RQ-HEHD (last visited Nov. 15, 2023).

175 *Explore the Minneapolis 2040 Goals*, MINNEAPOLIS 2040, https://perma.cc/Z7KL-B8M (last visited Nov. 15, 2023).

176 *Urban Agriculture and Food Production: Support and Promote Urban Agriculture and Local Food Production*, MINNEAPOLIS 2040, https://perma.cc/9JGC-XAVP (last visited Nov. 15, 2023) (listing action steps supporting traditional UA to include: "continu[ing] support for existing community gardens and urban agriculture," "support[ing] soil testing and remediation," "support[ing] leasing and explor[ing] selling City-owned lands for uses as community and market gardens," and "promot[ing] home gardening").

177 *Id.*

Finally, city planners can incorporate an equity lens into their planning to better support CEA practices. City planners use an equity lens to consider the impact on under-represented communities when making planning decisions, and in CEA, an equity lens would allow planners to better manage the gentrification and displacement concerns associated with urban agriculture, especially since the potential for these outcomes are less known with CEA. Seattle, Washington and Baltimore, Maryland have introduced equity lens analyses into their planning efforts, both of which have already been (or could be) used to support traditional UA projects.[178] These cities' lenses are very similar: each requires gathering data about existing community conditions, involving stakeholders from under-served or under-represented communities who could be impacted by potential projects in the planning process, analyzing the benefits and burdens of proposed projects, and creating accountability measures to ensure city-planned projects include lasting equitable measures.[179]

An equity lens would be effective in ensuring new CEA projects account for community impacts, especially because CEA projects are capital-intensive ventures driven by profit, often selling more expensive produce to higher-end consumers and lacking as many natural ties to community actors as traditional UA projects.[180] To realize CEA's potential for positive community impacts—like increasing food security with increased fresh produce supply or creating local job and skill-building opportunities—city planners should consider the impact of CEA projects on local communities and should seek input from community stakeholders before planning for and supporting these projects. Incorporating an equity lens analysis creates an additional step in the regulatory process, but is even more imperative for CEA than traditional UA because cities have less experience with its impact on underserved communities.

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178 BALT. OFF. OF SUSTAINABILITY, THE 2019 BALTIMORE SUSTAINABILITY PLAN 135, 145 (2019) [hereinafter THE 2019 BALTIMORE SUSTAINABILITY PLAN], https://perma.cc/B5UV-HTMP (explaining how the city's equity lens analysis within its sustainability plan should be used for pursuing the various initiatives contained in the plan, including urban agriculture); *see also* Horst et al., *supra* note 15, at 289–90 (explaining how Seattle's Department of Neighborhoods applied a city planning-wide equity lens to address inequities present in the city's community gardening program).

179 *See* THE 2019 BALTIMORE SUSTAINABILITY PLAN, *supra* note 178, at 135–36; SEATTLE RACE & SOC. JUST. INITIATIVE, RACIAL EQUITY TOOLKIT, https://perma.cc/YRR3-4AEN (last visited Nov. 15, 2023).

180 *See* Carolan, *Urban Farming Is Going High Tech, supra* note 30, at 49 ("A key variable [in vertical UA] is capital intensity"); *see* SANTO ET AL., *supra* note 5, at 15 (explaining that CEA projects are associated with higher priced goods); *see* Carolan, *Digital Urban Agriculture, supra* note 6, at 661 (noting that vertical UA platforms are "noticeably disconnected to local, nonfinancial organizations").

C. Collaboration with Urban Agriculture Adjacent Government Departments Applied to CEA

Departments and offices established by cities that work to address sustainability, the environment, or other urban agriculture-related policies are effective at promoting urban agriculture because they work directly with communities affected by city policies.[181] These offices' strategies for managing urban agriculture vary greatly, with most directly supporting traditional UA and only scratching the surface with CEA. Cities interested in promoting CEA could collaborate with, or create, these governmental departments to better understand the positive and negative impacts of CEA projects on their communities and to design strategies that leverage CEA in furtherance of their adjacent policy goals.

The Baltimore Office of Sustainability worked with Baltimore residents, community nonprofits, businesses, and local government to develop a sustainability plan for the city which identified strategies for improving communities, the environment, and the local economy.[182] Within the community pillar of the plan, the office identified several actions aimed at supporting urban agriculture, two of which specifically contemplate supporting CEA: creating land-use policies to encourage "private and institutional landholders to . . . establish [urban] agricultural space (both outdoor *and indoor*);" and supporting urban farmers' financial viability by connecting them to helpful resources—such as in-soil equipment resources and "infrastructure for production in *non-soil environments, such as hydroponics*."[183] Seattle's Office of Sustainability and Environment also identified CEA-related strategies alongside traditional UA policies in its Food Action Plan, which included promoting community garden programs on city-owned lands, as well as exploring opportunities to *expand rooftop and building integrated agriculture*.[184]

Because CEA is a relative newcomer compared to traditional UA, more research is needed to determine the full environmental, social, and economic impacts of new CEA technologies on urban communities.[185] Government agencies regularly assess the potential environmental and community impacts of their actions and the actions of private entities with which they work.[186] Therefore, cities interested in promoting CEA should work with these departments to understand the urban agriculture environment in the city communities, document resources relevant to successful CEA, and develop plans to promote CEA on the

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181 *See* Pawlowski, *supra* note 5, at 555–56.

182 THE 2019 BALTIMORE SUSTAINABILITY PLAN, *supra* note 178, at 5, 52–53.

183 *Id.* at 52–53 (emphasis added).

184 CITY OF SEATTLE OFF. OF SUSTAINABILITY & ENV'T, SEATTLE FOOD ACTION PLAN 21–25 (2012), https://perma.cc/3F4W-ZWSF.

185 *See* RANGARAJAN & RIORDAN, *supra* note 14, at 65.

186 NEVIN COHEN ET AL., FIVE BOROUGH FARM, SEEDING THE FUTURE OF URBAN AGRICULTURE IN NEW YORK CITY 135 (2012).

local level that can also serve urban agriculture-related policy objectives. City departments can adopt actions similar to those of Baltimore and Seattle by encouraging CEA or exploring ways to expand these practices. These offices' understandings of the positive and negative impacts of CEA projects on their communities empowers them to thoughtfully support CEA's expansion and to design strategies that will maximize potential community benefits as it becomes more popular.

D. Collaboration with Non-Governmental Organizations Applied to CEA

Non-governmental organizations could also play a particularly important role in assisting cities that want to promote CEA in urban communities while giving community stakeholders a voice in the implementation. These might be organizations that can provide CEA operators with resources or policy-oriented groups working with cities to make CEA more accessible. However, for cities to ensure true representation of community stakeholders, they need to be aware of the compositions of these groups and how the efforts of these groups may impact urban communities.

Cities can identify and support community organizations already providing CEA-related resources to communities. For example, NY Sun Works is a non-profit organization in New York City that partners with urban schools to build hydroponic-farming science labs in classrooms and to teach students about science, nutrition, and sustainable development.[187] The organization is supported by various public partners, including the New York Power Authority, New York City Office of Sustainability, and the presidents of different city boroughs.[188]

Although not all cities will have active organizations like NY Sun Works, they will have close relationships with municipal-related institutions such as public schools, hospitals, and public housing developments, any of which could also serve as a CEA farm to support common public policy goals like education, vocational training, and food access.[189] These institutions offer cities potential opportunities to partner with non-governmental organizations on the expansion of CEA. New York City's partnership with NY Sun Works demonstrates how cities can partner with local groups to create community benefits using CEA. For example, because many primary and secondary schools, community colleges, and universities around the country already

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[187] *See* The Greenhouse Project, *Project Overview*, N.Y. SUN WORKS, INC., https://perma.cc/C42J-36DY (last visited Nov. 21, 2023) (gives a basic overview of the organization's mission).

[188] The Greenhouse Project, *Friends of NY Sun Works*, N.Y. SUN WORKS, INC, https://perma.cc/W97D-VBHA (last visited Nov. 21, 2023); The Greenhouse Project, *Community-Based Hydroponics: a NYPA, UPROSE, and NY Sun Works Initiative*, N.Y. SUN WORKS, INC, https://perma.cc/NA67-WXSJ (last visited Dec. 17, 2023).

[189] *See* COHEN ET AL., *supra* note 186, at 52–56 (describing examples of institutional farms in New York City located at public schools, affordable housing developments, and corrections facilities).

directly engage students in CEA-related learning,[190] cities can explore partnerships with these institutions to grow CEA practices and create opportunities for increased fresh food access, skills training, and social connections within communities. Notably, such projects could use CEA technologies on similar scales to only support their partnered institutions, as opposed to large-scale commercial CEA ventures working to maximize output and profit.

Cities may be able to rely on non-governmental policy-oriented groups to make CEA more accessible. For example, food policy councils (FPCs) are one potential vehicle for involving community stakeholders in urban agriculture planning for CEA.[191] State, county, or local governments may establish FPCs or grassroots activists may organize an FPC independently.[192] Various community stakeholders and local food system leaders often sit on FPCs,[193] where they research and evaluate food systems issues, identify problems, and develop and recommend policies, sometimes using urban agriculture to address the identified food system needs.[194] Because of CEA's potential to increase food security, and because of the close relationships FPCs have with community stakeholders, city governments could work with FPCs to design policies that make CEA and CEA products more accessible to urban communities.

Other advocacy and non-governmental groups can similarly conduct research used to promote CEA. For example, Columbia University researchers identified three thousand acres of rooftop space in New York City with the potential to be used for urban agriculture.[195] Given CEA's application to rooftop farming, efforts like these could be significant for assisting cities in making CEA more accessible to different communities city-wide. Where cities may not have sufficient resources to conduct these kinds of studies, advocacy and non-governmental groups can research gaps. To better design CEA projects that equitably achieve the potential benefits of food access, jobs, skill development, and social advancement, city planners can support these projects and invite these projects' members to advise city leaders as they develop methods for supporting urban agriculture.

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190 *See, e.g.*, Hannah Kliger, *Students Across 60 NYC Schools Are Getting an Urban Farming Curriculum*, CBS NEWS N.Y. (Sept. 7, 2023), https://perma.cc/57FG-DP4P; *NIFA Invests $9.4M in Urban, Indoor, and other Emerging Agricultural Production Research, Education and Extension Initiative*, NAT'L INST. OF FOOD & AGRIC., U.S. DEP'T OF AGRIC., (Mar. 21, 2023), https://perma.cc/VTH8-ZCHL.

191 Nevin Cohen, *The Changing Role of Urban Agriculture in Municipal Planning* in *Achieving Sustainable Urban Agriculture*, *in* ACHIEVING SUSTAINABLE URBAN AGRICULTURE 23, 32 (J.S.C. Wiskerke ed., 2020).

192 Elizabeth G. Berg, *Bringing Food Back Home: Revitalizing the Postindustrial American City through State and Local Policies Promoting Urban Agriculture*, 92 OR. L. REV. 783, 800 (2014); Mukherji & Morales, *supra* note 111, at 3.

193 Cohen, *supra* note 191, at 10–11.

194 *See* Berg, *supra* note 192, at 800; RANGARAJAN & RIORDAN, *supra* note 14, at 73; Mukherji & Morales, *supra* note 111, at 3; Cohen, *supra* note 191, at 10–11.

195 *See* Cohen, *supra* note 191, at 4.

By integrating recommendations from non-governmental policy groups into urban agriculture planning, city governments can create policies that reflect the work of these local organizations.[196] However, if these groups overwhelmingly include stakeholders that do not directly reflect the interests of the affected communities, they can create inequitable results through their introduction, framing, and advocacy of such policies.[197] A common critique of groups like FPCs is that they are often dominated by predominantly white professionals rather than members of those communities most affected by food systems challenges.[198] Research has shown that urban agriculture projects led by people of color or lower-income communities receive less funding and political support compared to those led by white, middle-class, or professional policy organizations.[199] Given CEA's lack of grassroots community connections and profit-driven nature, any non-governmental policy-oriented groups advocating for CEA projects should be heeded with caution to ensure that eventual initiatives respond to the needs of the communities potentially affected. Cities relying on policy-oriented groups to help plan urban agriculture and CEA projects should determine who is leading these groups, verify that stakeholders from the affected communities are involved in the planning process, and ensure that any resulting policies incorporate the interests of those community members.

E. Securing or Incentivizing Urban Agriculture Using Public Resources Applied to CEA

Government efforts to make land more available for urban agriculture, including economic incentives, are also available tools for expanding CEA projects. However, these tools apply to CEA differently than how they apply to traditional UA because CEA does not face the same economic and physical location challenges as traditional UA. Programs aimed at supporting CEA by providing land security- or economic-related incentives should encourage CEA projects in the urban built environment and benefit communities rather than locations.

Municipal tools designed to make plots of land more accessible to individuals interested in traditional UA farming will be inapplicable to CEA. Unlike traditional UA projects, CEA projects are typically built inside or on rooftops for commercial purposes and organized by founders

196 Halvey et al., *supra* note 106, at 9.

197 *See* Sam Boden & Brandon M. Hoover, *Food Policy Councils in the Mid-Atlantic: Working Toward Justice*, J. AGRIC., FOOD SYS., & CMTY. DEV., Spring 2018, at 39, 44–48 (discussing examples of FPCs that did not represent the "economic, racial, and gender diversity" of the communities they intended to serve).

198 Halvey et al., *supra* note 106, at 9.

199 *Id.* (citing Nevin Cohen & Kristin Reynolds, *Urban Agriculture Policy Making in New York's "New Political Spaces": Strategizing for a Participatory and Representative System*, 34 J. PLAN. EDUC. RSCH. 221, 227 (2014)); *see also* Horst et al., *supra* note 15, at 284.

with access to capital or credit for these high-cost projects, rather than established via grassroots efforts and led by local communities.[200] Accordingly, municipal programs that lease or license vacant city plots to traditional UA farmers who would not otherwise have access to such land will not be appropriate for CEA operators. This is because CEA operators are better positioned to afford the cost of an urban location themselves (which most often must use a building structure anyway), and because CEA is not as immediately accessible compared to soil-based farming which (apart from needing a vacant plot of vacant land) requires lower startup costs and commitments.[201]

Economic and tax incentive programs may be more promising for CEA. But if these initiatives are to be used in neighborhoods with vacant land or structures, low economic opportunity, and historic disinvestment, cities should design these incentives to avoid the potential for green gentrification and displacement. To ensure benefits flow to affected urban communities, economic and tax incentive programs supporting CEA projects should require operators to support the surrounding communities through the prioritization of food security, job creation, and community revitalization. For example, AeroFarms, a national CEA operator, is a recipient of multiple tax incentive grants from New Jersey and cities within the state where farms were located.[202] The New Jersey Economic Development Authority, a state government economic development entity, provided AeroFarms with tax incentives of $11.14 million over a ten-year period to build a large indoor farm in Camden, New Jersey, and tied this support to job creation goals and improved access to local, healthier foods in the state.[203] AeroFarms also partnered with Jersey City, New Jersey to build ten vertical CEA farms throughout the city "located in senior centers, schools, public housing complexes, and municipal buildings," with the goal of making healthy food products free to disadvantaged members of local communities.[204]

Public-private partnerships supporting CEA, like the AeroFarms tax incentive projects, can seem promising for communities. However, government entities providing grants and tax incentives for CEA

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200 Goodman & Minner, *supra* note 10, at 161, 171; *see* Carolan, *Urban Farming Is Going High Tech, supra* note 30, at 49.

201 Goodman & Minner, *supra* note 10, at 171.

202 *Food Companies Leverage EDA Resources and State's Unique Assets to Support Growth*, N.J. ECON. DEV. AUTH. (Feb. 27, 2017), https://perma.cc/L645-TU83 (describing an AeroFarms project built in Newark, New Jersey supported by state-sponsored economic development programs).

203 *See* Meg Fry, *Growth Company: Aerofarms is Attracting Attention, Expanding its Farming Locations—and, Maybe, Changing the World*, ROI-NJ (June 11, 2018), https://perma.cc/WB4X-LHTP.

204 *In Wake of Pandemic, Jersey City Set to Launch 1st in the Nation Comprehensive Inner City Vertical Farming Program*, CITY OF JERSEY CITY (June 10, 2020), https://perma.cc/2U4Y-8SPB. This project is also linked to a broader Healthy Cities and Communities 2020 initiative sponsored by the World Economic Forum. *Id.*

businesses should approach these partnerships with caution because "more information is needed to determine under what conditions [CEA] businesses can deliver on production, jobs, and return on investment" for communities.[205] Critics argue against *location-based* tax incentives that solely aim to spur investment in disadvantaged areas, as they may lead to the gentrification of those neighborhoods.[206] Lawmakers can recognize this pitfall and mitigate these harms by designing *community-oriented* tax incentives—incentives tied to benefitting communities, rather than mere locations.[207] These tax incentives could encourage CEA investment in low-income communities by tying certain project requirements designed to benefit the local community, such as investments in food security, local human capital, and community services to the tax incentives.[208]

V. CONCLUSION

CEA is a promising new form of urban agriculture that will likely become a mainstay in urban environments in the near future, but it must achieve tangible benefits for urban communities if it is to have a lasting impact similar to traditional UA. Municipalities can use the various planning and legal tools already used to support traditional UA, such as updating zoning laws, comprehensive planning, collaborating with policy-adjacent governmental departments, collaborating with non-governmental entities, and securing or incentivizing urban agricultural efforts using public resources, to achieve those tangible benefits through CEA. However, municipalities must consider CEA separately from traditional UA when using these tools because these two forms of agriculture operate differently, and each will have its own unique relationship with urban communities. Decisionmakers must consider these nuances and thoughtfully adjust strategies used to support and foster traditional UA when expanding CEA.

To obtain positive community effects associated with urban agriculture like increased food security, job and skill-building opportunities, and community development, while also avoiding the negative effects like gentrification and displacement, municipalities interested in expanding CEA must design their planning strategies to account for CEA's unique characteristics. This is especially true given CEA's shorter history compared to traditional UA, and because more research is needed to determine the full environmental, social, and economic impacts of new CEA technologies on urban communities. Although CEA is an exciting form of food production that will be

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205 *See* RANGARAJAN & RIORDAN, *supra* note 14, at 65.

206 *See* Michelle D. Layser, *The Pro-Gentrification Origins of Place-Based Investment Tax Incentives and a Path Toward Community Oriented Reform*, 2019 WIS. L. REV. 745, 761, 766, 800 (2019).

207 *Id.* at 761, 800.

208 *Id.* at 761.

necessary in the future, cities should approach supporting CEA with caution in order to avoid the inequities that plagued urban agriculture in the past.