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## 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

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# 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

MICHAEL CAROLAN\*

Urban agriculture takes many forms. Often, the term elicits images of raised beds, hoop houses, and, in those instances where topsoil is both present and non-contaminated, in-ground gardens—what I call traditional urban agriculture (“TUA”). But that imagery is changing, especially in some parts of the country where vacant space is scarce and land prices dear. In those instances, cities are seeing growth in digital urban agriculture (“DUA”).<sup>1</sup> DUA, as defined here, refers to farming within urban and peri-urban areas that incorporates elements of automation, software, and/or silicon-based hardware into their operations.<sup>2</sup> While this definition is not meant to draw a solid line between particular practices, allowing for a clean categorization across these two types, it does help 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, energy throughputs, etc. Although DUA often takes “vertical” forms, I prefer the modifier “digital” for analytic emphasis, noting that a farm operation’s height is a less significant independent variable than processes related to its silicon-based, data-intense, sunk-capital attributes.<sup>3</sup>

Scholarship looking at farming within urban and peri-urban spaces presents a mix of outcomes. On the one hand, examples can be pointed to showing its links to empowerment, food sovereignty, public health, improved educational and vocational outcomes, reductions in crime, and

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<sup>1</sup> Rodrigo M. Pereyra, *Digital Farming’s “Up In The Air” Moment*, URB. AG NEWS (Mar. 19, 2020), <https://urbanagnews.com/blog/exclusives/digital-farmings-up-in-the-air-moment/> [<https://perma.cc/4JH8-65Z5>].

<sup>2</sup> 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).

<sup>3</sup> *Id.*

community nutrition.<sup>4</sup> On the other hand, farming in the city has been associated with gentrification, as well as to the amplification of cultural, racial, and class distinctions within a community.<sup>5</sup> The latter have been repeatedly linked to a phenomena known as the “growth machine,” which speaks to initiatives tied to an elite-driven coalition set on maximizing the city’s tax revenues whilst reinforcing the group’s privilege and status.<sup>6</sup>

Not surprising, then, in light of these varied outcomes, peoples’ perceptions of agriculture within urban and peri-urban spaces is equally mixed.<sup>7</sup> Many view TUA as a productive, multifunctional use of vacant land in inner cities on the losing end of global macroeconomic structural change and demographic abandonment; this is a dynamic option to the decays associated with global flows.<sup>8</sup> The sticking point, where there is one, tends to be on the temporality of these urban and peri-urban forms. Namely, is urban farming a viable long-term solution or just a temporary fix until something better presents itself? As farmers struggle to gain long-term,

<sup>4</sup> See, e.g., Chiara Tornaghi, *Urban Agriculture in the Food-Disabling City: (Re)defining Urban Food Justice, Reimagining a Politics of Empowerment*, 49 ANTIPODE 781, 781–82 (2017); Daniel Block et al., *Food Sovereignty, Urban Food Access, and Food Activism: Contemplating the Connections Through Examples from Chicago*, 29 AGRIC. & HUM. VALUES 203, 212 (2012); António José Dinis Ferreira et al., *Urban Agriculture, a Tool Towards More Resilient Urban Communities?*, 5 CURRENT OP. ENV'T SCI. & HEALTH 93, 93 (2018); Kate H. Brown & Andrew Jameton, *Public Health Implications of Urban Agriculture*, 21 J. PUB. HEALTH POL'Y 20, 35–36 (2000); Carolyn Dimitri et al., *Urban Agriculture: Connecting Producers with Consumers*, 118 BRIT. FOOD J. 603, 612 (2016); Art McCabe, *Community Gardens to Fight Urban Youth Crime and Stabilize Neighborhoods*, 7 INT'L J. CHILD HEALTH & HUM. DEV. 1, 9 (2014); Jessica Owley & Tonya Lewis, *From Vacant Lots to Full Pantries: Urban Agriculture Programs and the American City*, 91 UNIV. DET. MERCY L. REV. 233, 242 (2014).

<sup>5</sup> See, e.g., MATT HERN, WHAT IS A CITY FOR? REMAKING THE POLITICS OF DISPLACEMENT 62–67 (2017); Michael Carolan & James Hale, “Growing” Communities with Urban Agriculture: Generating Value Above and Below Ground, 47 CMTY. DEV. 530, 530–45 (2016); Jason Reece, *Seeking Food Justice and a Just City Through Local Action in Food Systems*, 8 J. AG., FOOD SYS., & CMTY. DEV. 211, 213–14 (2018); Lisa Berglund, *Critiques of the Shrinking Cities Literature from an Urban Political Economy Framework*, 35 J. PLAN. LITERATURE 1, 11 (2020); Charlotte Glennie, *Cultivating Place: Urban Development and the Institutionalization of Seattle’s P-Patch Community Gardens*, 19 CITY & CMTY. 726, 726 (2020).

<sup>6</sup> Gordon MacLeod, *Urban Politics Reconsidered: Growth Machine to Post-Democratic City?*, 48 URB. STUD. 2629, 2629 (2011); Harvey Molotch, *The City as a Growth Machine: Toward Apolitical Economy of Place*, 82 AM. J. SOCIO. 309, 309 (1976).

<sup>7</sup> Kameshwari Pothukuchi, *Vacant Land Disposition for Agriculture in Cleveland, Ohio: Is Community Development a Mixed Blessing?*, 40 J. URB. AFFS. 657, 657–78 (2018).

<sup>8</sup> See, e.g., H. Losada et al., *Urban Agriculture in the Metropolitan Zone of Mexico City: Changes Over Time in Urban, Suburban and Peri-Urban Areas*, 10 ENV'T & URBANIZATION 37, 37–54 (1998).

secure access to land in many cities, they are facing considerable resistance from many, often situated in influential positions of power.<sup>9</sup> Those in these roles of authority and situated within organizations with access to capital and credit tend to view TUA as a temporary use of vacant land—a placeholder until an investment opportunity arises.<sup>10</sup> A common tension then lies between those who view TUA as an important long-term solution for many inner-city problems and others who might value it in the immediate term but only until large transformational investments can be made upon those vacant pieces of land.<sup>11</sup>

I interrogate this tension and what it means for future community dynamics by drawing from eighty-two semi-structured interviews with community partners, investors, local food power brokers (e.g., chefs, politicians, developers), planners, and engineers involved in facilitating farming within their respective cities, which includes both TUA and DUA. Respondents were located in Denver (CO), New York (NY), and San Francisco (CA). I further supplement these data with notes taken during public forums and by analyzing the websites of organizations and business that respondents work for.

Not all urban agriculture is equal, as we might guess, in terms of attachments to networks and resources. For instance, while those connected closely to organizations linked to economic development frequently view TUA as a temporary fix to the city's ills, they alternatively view DUA quite differently, in some cases going so far as to refer to these platforms as the “ideal, long-term best use of currently vacant urban space,” to quote a developer from the below study.<sup>12</sup> Alternatively, those linked with community organizations and with a history of social activism are shown to cast TUA as a long-term fix to many inner-city problems, whereas DUA risks making those problems worse.

The Article begins by reviewing the literature as to the costs and benefits of urban agriculture.<sup>13</sup> I then pivot to a discussion of methods where I provide an overview of the sample population as well as a

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<sup>9</sup> Sheila R. Castillo, *Regulatory and Other Barriers to Urban and Peri-Urban Agriculture: A Case Study of Urban Planners and Urban Farmers from the Greater Chicago Metropolitan Area*, 3 J. AG., FOOD SYS., & CMTY. DEV. 155, 155–66 (2013).

<sup>10</sup> LAURA LAWSON, CITY BOUNTIFUL: A CENTURY OF COMMUNITY GARDENING IN AMERICA 24 (2005); Pothukuchi, *supra* note 7, at 657.

<sup>11</sup> Pothukuchi, *supra* note 7.

<sup>12</sup> See *infra* Part II.

<sup>13</sup> See *infra* Part I.

description of the socio-organizational network analyses,<sup>14</sup> which was conducted in parallel with the qualitative, face-to-face interviews.<sup>15</sup> The findings are organized around the themes of perceptions, networks, and resources. I interrogate, in other words, respondents' *views* toward various urban farming forms (Theme #1), their respective *social networks* (Theme #2), and what *resources* flow through these social groupings (Theme #3). These data paint a picture of a contentious future, as urban economic growth interests are shown to play a central role in urban food politics, perhaps even more so thanks to DUA.

## I. URBAN AGRICULTURE: A MIXED LEGACY

Urban agriculture is a widely employed intervention to address food insecurity in metropolitan areas, practiced by roughly 800 million people worldwide.<sup>16</sup> Some fifteen to twenty percent of the world's food is said to be grown in urban areas.<sup>17</sup> But food is not the only thing raised by these platforms. Importantly, urban agriculture has been linked to job creation and income generation.<sup>18</sup> Projects co-designed by disadvantaged groups (e.g., female-headed households, recent immigrants, unemployed youth) have been employed around the world, in high- and low-income countries, and have been shown to be a vehicle for social and economic justice.<sup>19</sup>

Urban farming has also been linked to skills acquisition and education, especially in the context of providing community members with

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<sup>14</sup> Socio-organizational networks refer to networks between organizations as much as between individuals.

<sup>15</sup> See *infra* Part II.

<sup>16</sup> Mawuna Donald Houessou et al., *What Constraints the Expansion of Urban Agriculture in Benin?*, 12 SUSTAINABILITY 1, 2 (2020).

<sup>17</sup> NANCY KARANJA ET AL., WORLDWATCH INST., STATE OF THE WORLD 2011: INNOVATIONS THAT NOURISH THE PLANET (2011).

<sup>18</sup> FOOD & AG. ORG., FAO'S CONTRIBUTION TO URBAN AND PERI-URBAN AGRICULTURE IN MEMBER COUNTRIES (1997), [http://www.fao.org/unfao/bodies/COag/cOAG15/X0076e.htm#P238\\_36006](http://www.fao.org/unfao/bodies/COag/cOAG15/X0076e.htm#P238_36006) [<https://perma.cc/E4PR-QBLN>].

<sup>19</sup> See, e.g., Mario Gonzales Novo & Catherine Murphy, *Urban Agriculture in the City of Havana: A Popular Response to a Crisis*, in GROWING CITIES, GROWING FOOD: URBAN AGRICULTURE ON THE POLICY AGENDA 330 (2000); Margaret Armar-Klimesu, *Urban Agriculture and Food Security, Nutrition, and Health*, in GROWING CITIES, GROWING FOOD: URBAN AGRICULTURE ON THE POLICY AGENDA 103 (2000); Olalekan John Taiwo, *Determinants of Peri-Urban and Urban Agricultural Locational Choice Behaviour in Lagos, Nigeria*, 39 LAND USE POL'Y 320, 320 (2014); Melissa N. Poulsen et al., *A Systematic Review of Urban Agriculture and Food Security Impacts in Low-Income Countries*, 55 FOOD POL'Y 131, 131 (2015).

knowledge that translates to other sectors of the economy.<sup>20</sup> Take the now-defunct Milwaukee (WI)–based Growing Power urban farming organization. At its peak, Growing Power trained thousands annually through its collaborations with other centers located throughout the United States.<sup>21</sup> These partnerships included the Brooklyn Rescue Mission, Detroit Black Community Food Security Network, and the Minnesota-located Women’s Environmental Institute.<sup>22</sup> Milwaukee’s African American Male Unemployment Task Force famously funded Growing Power to create 150 full-time agricultural jobs for low-income residents.<sup>23</sup> Growing Power also helped support programs that enrolled teens from lower-income families so they could acquire skills about food production and preparation, business, community leadership, and public speaking.<sup>24</sup>

There is a rich literature pointing to urban agriculture’s links to social capital and community capacity, especially among otherwise marginalized communities.<sup>25</sup> In addition to giving participants a sense of self-worth and connection to their community, these platforms have also been shown to act as incubation spaces for social entrepreneurialism and collective activism.<sup>26</sup> The flip side to the argument that urban farming builds social capital is the evidence pointing to how these platforms have

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<sup>20</sup> Lena Hatchett et al., “*Something Good Can Grow Here*”: *Chicago Urban Agriculture Food Projects*, 43 J. PREVENTION & INTERVENTION CMTY. 135, 146 (2015); 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, 281 (2017); David W. Oliver & Lindy Heineken, *The Personal and Social Benefits of Urban Agriculture Experienced by Cultivators on the Cape Flats*, 34 DEV. S. AFR. 168, 173 (2017); Tinashe Paul Kanosvambira & Daniel Tevera, *Urban Agriculture as a Source of Social Capital in the Cape Flats of Cape Town*, 39 AFR. GEOGRAPHICAL REV. 175, 182 (2020).

<sup>21</sup> Domenic Vitiello & Laura Wolf-Powers, *Growing Food to Grow Cities? The Potential of Agriculture for Economic and Community Development in the Urban United States*, CMTY. DEV. J. 1, 8 (2014).

<sup>22</sup> *Id.*

<sup>23</sup> *Id.*

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

<sup>25</sup> Carolan & Hale, *supra* note 5; Soren Christensen et al., *Urban Community Gardening, Social Capital, and “Integration”—a Mixed Method Exploration of Urban “Integration-Gardening” in Copenhagen, Denmark*, 24 INT’L J. JUST. SUSTAINABILITY 231, 231 (2018); Jonathan Kingsley et al., “*It’s about community*”: *Exploring Social Capital in Community Gardens Across Melbourne, Australia*, 49 URB. FORESTRY & URB. GREENING 1, 1 (2020).

<sup>26</sup> See Krista Harper & Ana Isabel Afonso, *Cultivating Civic Ecology: A Photovoice Study with Urban Gardeners in Lisbon, Portugal*, 23(1) ANTHROPOLOGY ACTION 6, 7 (2016); Daniel Keech & Matthew Reed, *Urban Agriculture as a Field: Governance, Communication and Collective Action*, in URBAN FOOD DEMOCRACY AND GOVERNANCE IN NORTH AND SOUTH 27, 28 (2020).

not been particularly successful at bridging otherwise different groups. An example of this lies in the rich literature noting examples where these alternative urban food systems are dominated by white actors and/or those located solidly in the middle-class communities, thus creating spaces, and practices, where marginalized groups feel out of place.<sup>27</sup>

There is also considerable literature highlighting the links between urban farming and a growing rent gap—the disparity between a site's actual value and its potential value at “best use.”<sup>28</sup> This phenomena also goes by the name of gentrification.<sup>29</sup> One analysis has calculated that the presence of urban gardens raised property values in an urban community by as much as 9.5 percent within five years of establishment, and tax revenues from these property increases were estimated at three quarters of a million dollars per garden over twenty years.<sup>30</sup>

This analysis links to arguments connecting urban agriculture with what has been called growth machine logic driving economic policy in metropolitan areas.<sup>31</sup> Molotch famously argued that urban politics are dominated by a pro-growth coalition that privileges land development that seeks ever-increasing land prices and rents.<sup>32</sup> Thus, local policies that provide limited or no benefits for businesses or affluent taxpayers tend to be avoided. This can also explain the aforementioned dichotomous view toward TUA, where agents associated with business and pro-growth policies are more likely to take a less positive long-term view of these platforms, viewing them as at best placeholders until something “better” comes along. Alternatively, community organizers and activists looking to alleviate inner-city ills, in part created because of that pro-growth logic, express more positive views toward TUA.<sup>33</sup>

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<sup>27</sup> See Christensen et al., *supra* note 25, at 231; Jill K. Clark et al., *Fail to Include, Plan to Exclude: Reflections on Local Governments' Readiness for Building Equitable Community Food Systems*, 43 BUILT ENV'T 315, 320 (2017); Antonio Roman-Alcala, *Concerning the Unbearable Whiteness of Urban Farming*, 5 J. AGRIC., FOOD SYS., & CMTY. DEV. 179, 179 (2015); Brandon M. Hoover, *White Spaces in Black and Latino Places: Urban Agriculture and Food Sovereignty*, 3(4) J. AGRIC., FOOD SYS., & CMTY. DEV. 538, 538 (2013).

<sup>28</sup> See Neil Smith, *Toward a Theory of Gentrification: A Back to the City Movement by Capital, Not People*, 45 J. AM. PLAN. ASS'N 538, 543 (1979).

<sup>29</sup> See HERN, *supra* note 5, at 64–65; Reece, *supra* note 5, at 214.

<sup>30</sup> See Vicki Been & Ioan Voicu, *The Effect of Community Gardens on Neighboring Property Values*, 46 N.Y.U. L. ECON. WORKING PAPERS, 2006, at 29.

<sup>31</sup> See Molotch, *supra* note 6, at 309.

<sup>32</sup> See *id.* at 314.

<sup>33</sup> See Pothukuchi, *supra* note 7, at 672.

I now explore some of these tensions empirically and how they play out across the TUA and DUA landscape.

## II. METHODS

This Article is based on data collected through eighty-two semi-structured interviews with a range of urban food system actors—e.g., community partners, investors, local food power brokers, planners, and engineers and technicians. Respondents lived in the cities of Denver (n = 30), New York (n = 26), and San Francisco (n = 26).<sup>34</sup> Table 1 provides some demographic information about the sample population. I selected these three sites principally because my social networks extended into each of these urban food landscapes. Potential participant names were collected by first reaching out to individuals in these cities whom I had worked with in the past. At the same time, organizations were identified through Internet searches using key phrases related to urban food systems, such as “urban agriculture,” “local food,” “community gardens,” “food security,” and “food access” in combination with the name of the city, which provided another list of possible respondents. While participants did not make the distinction between TUA and DUA, I refer to the latter when talking about operations that exhibited any of the following characteristics: e.g., automation exhibiting feedback (e.g., artificial intelligence capabilities); real-time/anytime surveillance; automation that notably replaced manual labor (e.g., “bots” that transported produce through a warehouse); and/or replacing traditional growing media (e.g., soil and natural sunlight) with alternatives (e.g., hydroponics, aeroponics, geaponics). Interviews ceased when theoretical saturation was achieved—a technique used in qualitative methods marked by when the researcher begins to only hear repeated themes.<sup>35</sup>

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<sup>34</sup> In adherence to the American Sociological Association’s Code of Ethics, interview transcripts remain on file with the author. Any additional information that could potentially identify interviewees cannot ethically be disclosed. See AM. SOCIO. ASS’N, CODE OF ETHICS 10 (2018), [https://www.asanet.org/sites/default/files/asa\\_code\\_of\\_ethics-june2018.pdf](https://www.asanet.org/sites/default/files/asa_code_of_ethics-june2018.pdf) [<https://perma.cc/B4B6-EMA5>].

<sup>35</sup> See Benjamin Saunders et al., *Saturation in Qualitative Research: Exploring its Conceptualization and Operationalization*, 52 QUALITY & QUANTITY 1893, 1895 (2018).



TABLE 1 DEMOGRAPHICS AMONG RESPONDENTS IN DENVER, NEW YORK, AND SAN FRANCISCO, RESPECTIVELY

	Denver (n=30)	New York (n=26)	San Francisco (n =26)
Gender			
Male	14	14	16
Female	15	12	10
Genderqueer	1	0	0
Ethnicity			
African American	4	10	4
Asian American	1	1	8
Indian American	0	1	2
Latinx	2	2	2
White	23	12	10
Age			
20–30	5	5	8
31–40	13	10	7
41–50	6	3	4
51–60	3	3	5
61–70	2	3	2
70+	1	2	0

To better understand the positionality of the respondents, Table 2 contains a breakdown of their job types.<sup>36</sup> I arrived at this information by asking them to self-identify their job/position relative to urban agriculture and urban food systems more generally. The term “farmer” included owner-operators as well as those who farmed land they did not own. The “community partner” category includes individuals who worked for area nonprofit organizations or area schools with a history of partnering with community organizations. An “investor” refers to venture capitalists/angel investors who were either independently wealthy (and invested their own capital) or managed large investment portfolios. An “entrepreneur” refers to owner-operators of (nonfarm) businesses, ranging from tech companies that developed smart farming gadgets (e.g., bots, software, hydroponic

<sup>36</sup> See *infra* Table 2.

systems, etc.) to restaurateurs whose supply chain included urban farms. “Planners” worked directly for municipal governments, as did those included in the “politician” category. Those in the “developer” category were tied to area growth machines as they oversaw the so-called revitalization of entire neighborhoods (all were high-level executives of large firms that acted as general contractors for these efforts). Lastly, respondents who identified as “real estate agent” held that job title and were connected to land deals that involved urban farming.

TABLE 2 JOB-TYPE AMONG RESPONDENTS IN DENVER, NEW YORK, AND SAN FRANCISCO, RESPECTIVELY

	Denver (n=30)	New York (n=26)	San Francisco (n =26)
Farmer (annual sales)			
Less than \$100,000	7	5	5
More than \$100,000*	2	5	6
Community partner	3	2	3
Investor	3	2	1
Entrepreneur (sans farmer)			
Tech start up	4	5	5
Restaurateur	3	2	1
Policymaker/politician	3	3	1
Developer	3	1	2
Real estate agent	2	1	2

\* Farms in this category all reported annual sales well in excess of \$100,000 annually, with a few giving estimates easily exceeding a million dollars.

Fieldwork occurred concurrently from August 2017 to November 2018. Face-to-face interviews lasted about an hour, were recorded, and later transcribed. Qualitative data analysis protocols were similar for all three sites. Two research assistants and I, trained in qualitative methods using NVivo software, independently coded two randomly selected transcripts for each group. Any inconsistencies in coding were reviewed until consensus was reached. I coded all remaining transcripts using those

initial codes as a guide. Only adults were interviewed. Pseudonyms have been used to protect the anonymity of respondents.

Respondents were also asked to complete an online Qualtrics survey, which included a social network component. The survey instrument asked participants to name the top five issue areas of their organization's work, their top five local collaborations and partnerships, and their top five funding sources (or fewer if five could not be listed). Social network survey responses were later uploaded into Visone, which allows for the visualization of social network data. The Qualtrics survey also contained other questions, which generated data that will be displayed momentarily using heat mapping and word cloud software.<sup>37</sup>

Lastly, I analyzed the websites, when available, of organizations associated with the interviewees. I did this to better understand the priorities, goals, and resources that most mattered for these organizations. These data helped to inform the analyses of resources flows that accompanied the social network analyses.

### III. FINDINGS

This section is organized around three themes: perceptions, networks, and resources. I first interrogate the varying ways that respondents thought about urban farming systems. This allows me to say something about the short- and long-term tensions in how DUA and TUA platforms are viewed across different groups. This variability in perception is then linked to respondents' contrasting social networks, which, in turn, proves consequential to the flow of resources through these urban food systems (i.e., DUA vs. TUA). The Discussion and Conclusion section, which follows, will reflect upon and synthesize those data.

#### A. *Perceptions: Contrasting Visions and Values*

Respondents were presented with two vignettes. One described a well-known example of a capital-intensive, digital urban farm made possible by millions of dollars from investors, including Amazon's Jeff Bezos.<sup>38</sup>

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<sup>37</sup> See *infra* Figures 1–3.

<sup>38</sup> See Leanna Garfield, *A Jeff Bezos-Backed Warehouse Farm Startup is Building 300 Indoor Farms Across China*, BUS. INSIDER (Jan. 23, 2018), <https://www.businessinsider.com/vertical-farming-company-jeff-bezos-plenty-china-2018-1> [<https://perma.cc/AHJ9-TH8P>].

The company supporting these farms is called Plenty.<sup>39</sup> The specific farm, located in South San Francisco, CA, is known as Tigris.<sup>40</sup> The other vignette described a successful organization located in Denver, CO, which engages in what I would call TUA—Denver Urban Gardens.<sup>41</sup> The vignettes read to respondents are described in Table 3. The language read was pulled directly from their respective websites. In addition to vignettes, respondents were also shown pictures of each farm.

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TABLE 3 VIGNETTES OF DUA (TIGRIS) AND TUA (DENVER URBAN GARDENS)

### Vignette #1 Tigris

Plenty's goal is to grow the best possible produce and to make it more accessible than ever before. We want to sustainably offer people the healthiest, happiest lives possible. Our new farm, codenamed Tigris, represents our largest and most ambitious leap forward. It demonstrates our ability to grow delicious produce using less than 5% of the water and less than 1% of the land compared to outdoor farms. By developing reliable, indoor, vertical farms that control everything our plants experience, we can reach people around the world with nutrient-rich fruits and vegetables that consumers will actually crave.

. . . .

Strawberries are more delicious in California because California is one of five Mediterranean climates in the world that has the ideal environment in which to grow produce. The Italian tomato isn't the best because Italian farmers are magical, but because Italian tomatoes benefit from the most perfect tomato-growing environment in nature. Inside the walls of our indoor farms, Plenty is able to create the perfect environment for almost any fruit or vegetable to create the perfect flavor. We can build local

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<sup>39</sup> See *id.*

<sup>40</sup> See Janelle Bitker, *With Huge New Vertical Farm, Plenty's Produce Could Hit More Shelves*, S.F. CHRON. (June 23, 2019), <https://www.sfchronicle.com/food/article/With-huge-new-vertical-farm-Plenty-s-produce-14021237.php> [<https://perma.cc/6RJU-GKGG>].

<sup>41</sup> See DENVER URBAN GARDENS, <https://dug.org> [<https://perma.cc/P7CF-G2RS>] (last visited Mar. 10, 2021).

farms and replicate the ideal environment near any city in the world. By eliminating long-distance transportation, we can harvest and put these foods in consumer's hands the same day.

.....

Building a new form of agriculture at a scale that can impact people around the world while using fewer resources and delivering mind-blowing flavor and nutrition is incredibly difficult. At Plenty, we have assembled an amazing team of the world's leading Plant Scientists, Flavor Experts, Hardware and Software Engineers, Growers, Operations experts, and people from many related fields. We have built dozens of farm prototypes to attack this challenge from every angle. We have grown hundreds of varieties of plants to find the highest yielding plants with flavors that will change expectations. Tigris isn't just a story about robots or climate control or LED lights or hydroponics. It is the first instance of a new way of feeding people that can deliver on the promise of each of these individual technologies when every detail is optimized.<sup>42</sup>

## Vignette #2 Denver Urban Gardens

Mission: Denver Urban Gardens comes alongside residents, and together, we cultivate gardeners, grow food and nourish community. DUG offers neighborhoods the essential resources for community gardens, including ongoing technical expertise with: securing sustainable land for gardens; designing and building gardens; supporting garden organization, leadership, outreach and maintenance; utilizing gardens as extraordinary places for learning and healthy living; and linking gardens with related local food system projects and policy.

We currently operate over 181 community gardens throughout Metro Denver, including more than 66 school-based community gardens. In addition to building and supporting community gardens, we operate DeLaney Community Farm, the Master Composter Training Program, the Master Community Gardener Training Program, Grow a Garden,

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<sup>42</sup> Plenty Farms, *Meet Tigris, Our Largest Farm to Date*, MEDIUM (Aug. 2, 2019), <https://medium.com/@plentyfarms/meet-tigris-our-largest-farm-to-date-6480d4294f74> [<https://perma.cc/VBD9-TCZV>].

and provide extensive opportunities for youth education in nutrition and gardening.

History: Denver Urban Gardens was established in 1985, in order to support Denver residents in creating sustainable, food-producing neighborhood community gardens. By 1993, DUG was the sole organization responsible for coordinating 21 active gardens, and by 1997, 32 new gardens and DeLaney Community Farm were established. Within the past decade, we have created multiple ongoing youth and community education programs designed to facilitate community involvement and ensure long-term garden sustainability. In the past 30+ years, our network of community gardens has grown to over 181, our youth education and community training programs have expanded to benefit thousands of underserved Coloradans annually, and we have seen through our research with the Colorado School of Public Health that our efforts have led to tangible, positive change in community health and food security.<sup>43</sup>

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After being read each vignette, respondents were asked the following two questions/statements: “This improves food access for inner-city neighborhoods” and “How would you assess this case as a long-term solution to vacant land in inner-city neighborhoods?” Both questions were attached to a 10-point Likert scale—the former, 1 (“strongly disagree”) to 10 (“strongly agree”); the latter, 1 (“not a solution at all”) to 10 (“yes, it has considerable long-term potential”). Responses were then aggregated and plotted on an X-Y graph. This produced a heat map. A heat map is a graphical representation of data that visually illustrates response frequency.<sup>44</sup> While scatter plots display a marker at the intersection of the values of an X variable and a Y variable, heat maps divide the graph into rectangular (or hexagonal) bins and utilize colors or variations in shade to show the frequency of observations that fall in each.<sup>45</sup> Figure 1 illustrates the result of this technique.

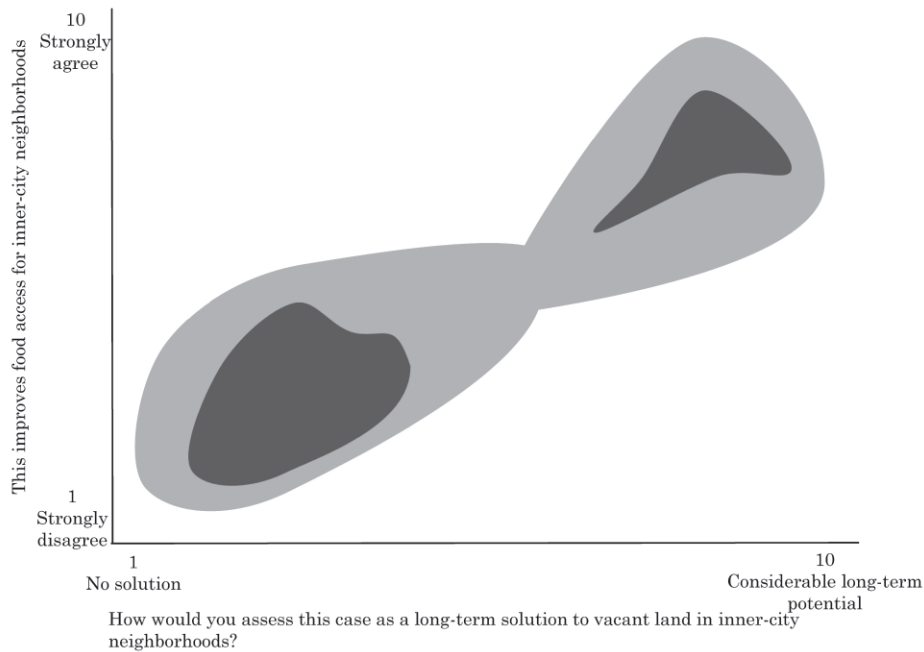
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<sup>43</sup> Press, DENVER URB. GARDENS, <https://dug.org/press/> [<https://perma.cc/Y6ZP-85KV>] (last visited Mar. 10, 2021).

<sup>44</sup> See WARREN F. KUHFIELD, HEAT MAPS: GRAPHICALLY DISPLAYING BIG DATA AND SMALL TABLES, SAS GLOB. F. 2017 (2017), <https://support.sas.com/resources/papers/proceedings17/SAS0312-2017.pdf> [<https://perma.cc/4U9U-QNVD>].

<sup>45</sup> *Id.* at 3.

**Figure 1:** Heat map plotting responses to the aforementioned food insecure inner-city neighborhoods and long-term solution to vacant land questions



The figure shows a bimodal response to those questions. Put simply, respondents largely either saw the vignettes describing a model directed at provided a long-term solution for food insecure communities and providing a best use of vacant land, or they did not. There were very few who offered middling answers to those two questions. Taken as a whole, respondents generally either expressed strong positive views toward Tigris or toward Denver Urban Garden. No respondent expressed strong positive views toward both platforms.

Respondents were then shown the following list of fourteen keywords: after-school programs; anti-hunger; economic growth; education; empowerment; food for area businesses; food for local community; hi-tech jobs; jobs; outside investment; poverty alleviation; social justice; tax revenue; and training. (These terms were gleaned from some of my prior research into urban food systems and were meant to capture values held by DUA and TUA proponents.)<sup>46</sup> We then briefly talked about the terms

<sup>46</sup> See generally MICHAEL S. CAROLAN, NO ONE EATS ALONE: FOOD AS A SOCIAL ENTERPRISE

to ensure everyone held a similar understanding of each. Afterward, participants were asked, “Select the two terms that best represent priorities you value when envisioning what urban agriculture should do for a city and its people.” Answers were then disaggregated into two groups based on the respondent’s earlier answer to the vignette exercise. Group 1 consisted of those who responded more positively to the DUA example, whereas Group 2 was made up of those who held more favorable attitudes toward the TUA case. Responses to the keyword question were then fed into word cloud generating software,<sup>47</sup> minus terms mentioned less than four times for purposes of improving image readability. (A word cloud is a graphical representation of word frequency.) Figures 2 and 3 are the result of this effort, from DUA proponents and TUA proponents, respectively. Though not by design, no term in either image was mentioned less than 6 times; a point that bolsters the argument that these are indeed keywords for individuals within these respective groups.

**Figure 2**



(2017); MICHAEL S. CAROLAN, *THE FOOD SHARING REVOLUTION: HOW START-UPS, POP-UPS, AND CO-OPS ARE CHANGING THE WAY WE EAT* (2018).

<sup>47</sup> A word cloud is a graphical representation of word frequency. See *Word Cloud*, CAMBRIDGE ENGLISH DICTIONARY, <https://dictionary.cambridge.org/us/dictionary/english/word-cloud> [<https://perma.cc/F2TC-RR23>] (last visited Mar. 10, 2021).



**Figure 3**

When triangulated with the prior heat map, the word clouds add resolution to the former image. They do this by revealing some of respondents' underlying values, which are animating views about what farming systems best support food access while also providing viable long-term solutions to vacant land. The dichotomy is stark. Those privileging DUA overwhelmingly articulated values, through their keyword selection, that privilege such phenomena as profit and economic rationality and where prosperity is reduced to financial growth, as evidenced by the terms "economic growth," "outside investment," "tax revenue."<sup>48</sup> While job growth was important for this group, the jobs desired, while high paying, were also premised on the possession of a college degree—"hi-tech jobs."<sup>49</sup>

The word clouds also help explain the variability in answers to the question signified by the y-axis on the heat map—"This improves food access for inner-city neighborhoods."<sup>50</sup> The concept of food access meant something very different depending on whether I was talking to,

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<sup>48</sup> See *supra* Figure 3.

<sup>49</sup> *Id.*

<sup>50</sup> Compare *supra* Figure 1 with Figure 2 and Figure 3.

say, a community organizer or a developer. Many favoring DUA talked about “food access” through, for instance, a colorblind lens, whereby issues of equity are replaced by notions of equality—namely, the principle of treating everyone the same, irrespective of systemic biases and prejudices.<sup>51</sup>

*These facilities can raise more food for everyone, rich, poor, Black, white, old, young. Not to mention the high paying jobs. It checks so many boxes. It's a win-win.*

–Denver, Developer<sup>52</sup>

*What's not to like—a farm that can simultaneously service multiple end-users, from restaurants and schools and homes and even food pantries. It makes local food access to all.*

–New York, Entrepreneur<sup>53</sup>

Relatedly, this group also talked about food access through a supply chain lens. Food access, then, concerned those who could afford food and did not consider how access and even affordability were unattainable for those whose livelihoods were threatened by raising land prices (the aforementioned growing rent gap: i.e., gentrification) and automation

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<sup>51</sup> Colorblind racial ideology generates outlooks and outcomes premised on the assertion that race no longer matters from the standpoint of realizing social, economic, and political success (i.e., the ‘American dream’). Colorblindness provides white Americans and those in positions of power with cognitive and discursive devices that can be used to defend the status quo by denying that racism persists while presenting outcomes in ways that are themselves colorblind. Examples of this include justifying residential and school segregation patterns as matters of individual choice. Or explaining education, employment, and incarceration inequities between whites and non-whites as matters relating to differences in familial structure (e.g., single mothers vs. two-parent families) or culture. Or perhaps opposing affirmative action on the grounds that it goes against the American principles of treating everyone the same. *See generally* EDUARDO BONILLA-SILVA, *WHITE SUPREMACY & RACISM IN THE POST-CIVIL RIGHTS ERA* (2001); Michael Carolan, *They Say They Don't See Color, but Maybe They Should!* *Authoritarian Populism and Colorblind Liberal Political Culture*, 27 *J. PEASANT STUD.* 1445 (2020); Douglas Hartmann et al., *Colorblindness as Identity: Key Determinants, Relations to Ideology, and Implications for Attitudes About Race and Policy*, 60 *SOCIO. PERSP.* 866 (2017); TIM WISE, *COLOR-BLIND: THE RISE OF POST-RACIAL POLITICS AND THE RETREAT FROM RACIAL EQUITY* (2010).

<sup>52</sup> *See supra* note 34.

<sup>53</sup> *Id.*

(usually what follows when well-paying, hi-tech jobs are created). The following is a quote that nicely encapsulates the interconnectedness of terms in Figure 3—e.g., “food for areas business,” “economic growth,” and “outsider investment,” and the like. The gestalt of this quote, in terms of the values represented, speaks to a worldview that stands in striking contrast to what was articulated by the pro-TUA group.

*The food we can grow within the neighborhood, and thanks to high-tech stacking technologies we can grow a ton—literally—in a building with a relatively small footprint. Well, the more we can grow the easier it is to attract outside investment, new business, especially those that food-related, like restaurants. . . . There is a multiplier effect, that's good for business and good for residents. High paying white-collar jobs and food. If we can provide both with one structure, that's pretty damn amazing, if you ask me.*

—San Francisco, Investor<sup>54</sup>

Alternatively, those supporting TUA held very different values, as evidenced by their word cloud.<sup>55</sup> They also thought quite differently about phenomena like “food access.”<sup>56</sup> The concept was neither color- nor class-blind but rather had connections to issues like “social justice” and “empowerment,” two terms that also prominently appear in Figure 2.<sup>57</sup>

*If an urban farm doesn't try to disrupt systems of oppression than it isn't doing its job. . . . When looking to enhance food access you have to take into consideration groups that are marginalized are target interventions to tackle those systematic inequalities, like through education programs and building community capacity.*

—New York, Farmer<sup>58</sup>

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

<sup>55</sup> *See supra* Figure 2.

<sup>56</sup> *Id.*

<sup>57</sup> *Id.*

<sup>58</sup> *See supra* note 34.

As opposed to viewing urban agriculture through the lens of economic rationality, individuals from this group preferred to evaluate these platforms through values relating to equity and justice. As a community organizer from Denver explained, “Some think food is the end here. But I’m not so sure. Yes, urban agriculture ought to produce food. . . . But just as important, if not more important, these farms are incubation spaces for activism aimed at social justice, like churches in the South during the Civil Rights Movement.”<sup>59</sup>

As you might expect, these divergent outlooks did not just happen. While the term “community” is colloquially used to speak about a group of people located within a bounded three-dimensional location, social scientists often opt for a different definition. In this context, the term references groups who inhabit shared social networks, as in the terms “communities of practice” or “epistemic communities.”<sup>60</sup> In the following subsection, I now investigate the worlds those values and perceptions inhabited, namely, respondents’ social networks.

### *B. Networks: Competing “Communities”*

To further contextualize the data from the previous subsection, I now look at how respondents in each of the three cities, in terms of their respective organizations, collaborate. Doing this illustrates consistency between what individuals thought about urban agriculture and who they interacted with, their social networks. I do this with the help of the social network survey mentioned in the Methods section.<sup>61</sup>

The nodes making up the networks are designated by the self-identified role identities highlight back in Table 2, which are explained in the figure’s respective keys.<sup>62</sup> Note, too, that the key reveals how to read each node according to whether it represents someone who prioritized DUA, TUA, or who gave a more ambivalent response. Socio-organizational networks for Denver, New York, and San Francisco are presented below—Figures 4, 5, and 6, respectively.

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<sup>59</sup> *Id.*

<sup>60</sup> ETIENNE WENGER ET AL., CULTIVATING COMMUNITIES OF PRACTICE: A GUIDE TO MANAGING KNOWLEDGE 3 (2002). See generally Morgan Meyer & Susan Molyneux-Hodgson, *Introduction: The Dynamics of Epistemic Communities*, 15 SOCIO. RSCH. ONLINE 109 (2010).

<sup>61</sup> See *supra* Part II.

<sup>62</sup> See *supra* Part II, Table 2.

Figure 4: Denver socio-organizational networks between respondents

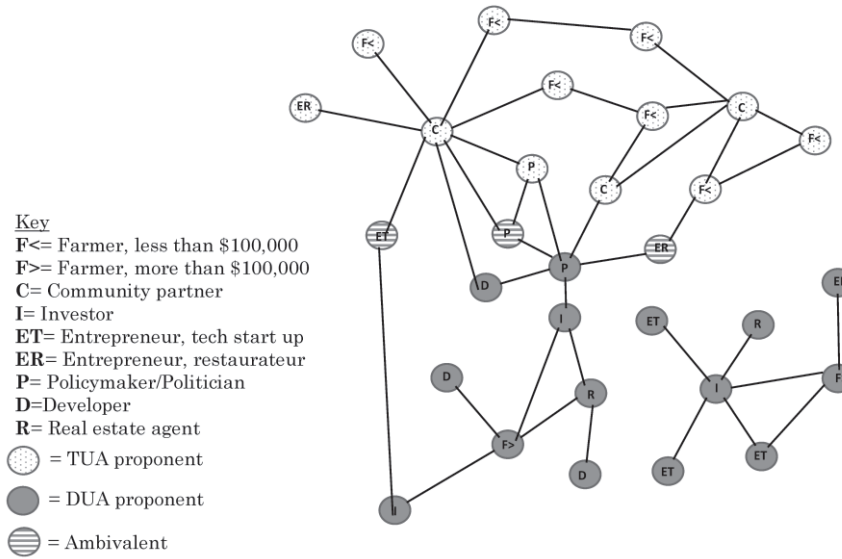
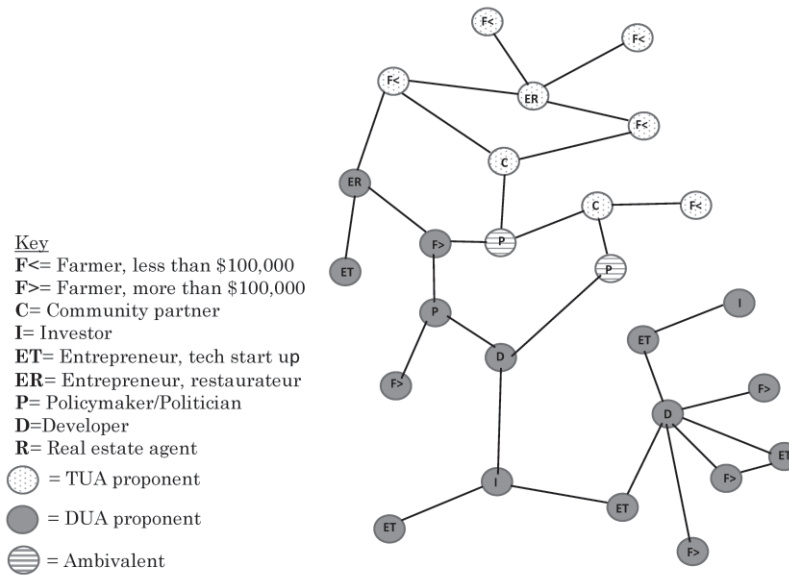
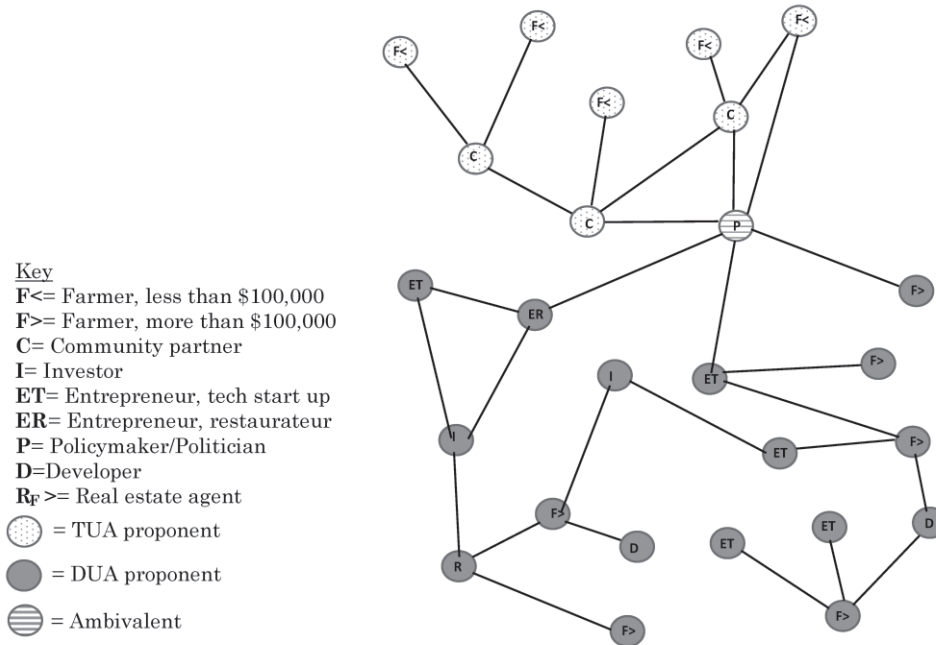


Figure 5: New York socio-organizational networks between respondents



**Figure 6:** San Francisco socio-organizational networks between respondents



To recall the Qualtrics survey, respondents were asked to list their top five local collaborations and partnerships.<sup>63</sup> Thus, the networks illustrated in the figures reflect important organizational partnerships—hence the term *socio-organizational* networks.<sup>64</sup> In other words, the connections are less about presenting a picture of who respondents *knew* and more a measure of the organizations/people *that mattered* for what respondents did within their respective urban food systems.

I will make a few comments about those networks now, while saving other remarks for the next subsection where the issue of resources is addressed.<sup>65</sup> The homogeneity within networks is especially striking, in terms of the values expressed in regard to urban agriculture. This can be seen by the low degree of collaborations and partnerships between the

<sup>63</sup> See *supra* Part II.

<sup>64</sup> They could also be called “ego networks,” to reflect terminology from the social network analysis literature. “Ego” is an individual node. Egos can therefore be persons, groups, organizations, or whole societies. See generally ROBERT A. HANNEMAN & MARK RIDDLE, INTRODUCTION TO SOCIAL NETWORK METHODS (2005).

<sup>65</sup> See *infra* Section III.C.

pro-TUA and pro-DUA groups, for instance. Curiously, the handful of ambivalent responses to the heat map question came from the respondents positioned, social network-wise, between those two groups.<sup>66</sup>

While this cannot be seen in the network images, it is important to point out that historical longevity looks to have played an important role in those connections, especially among the TUA proponents. Long-lived organizations were more often mentioned than others who had only been in existence a short period of time. Part of the reasons for this, which I will return to when discussing resources, lies in the fact that these networks often circulate social and human capital more so than financial capital. And unlike financial capital, which relies upon phenomena like financial regulations and legal structures (e.g., contract law) and therefore is not as dependent upon trust and reputation, social and human capital takes time to acquire, build, and exchange.<sup>67</sup>

In addition, organizations with multiple sites of operation were more likely to have been mentioned and thus be connected with other urban food system actors, especially among those supporting TUA. This relates to a point made in the prior paragraph. Many of those organizations focus on supporting ends that cannot be defined by economic rationality, which involved such goals as empowerment, social justice, and education—to use words from this network's word cloud. Yet these ends also presume a level of social embeddedness. That is to say, they require the involvement of actors and organizations who are socially present and, ideally, physically located within the community.

Alternatively, those championing DUA were able to assemble within a community and were able to enact their visions and values, as depicted in the heat map and their word cloud, respectively,<sup>68</sup> at far greater speeds, given the capital prioritized in these networks—financial capital. To quote one individual from the pro-DUA camp: “Money is money. I don't care where it comes from. . . . The limiting factor [when building DUA platforms] is almost always the financing bit” (New York, Real estate agent).<sup>69</sup> While phenomena—like community-level trust and reputation—were important, those in this group also reminded me that their “community” extended beyond the neighborhood level, to include, for example, non-local investors and/or lenders or a national headquarters located elsewhere—an

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<sup>66</sup> See generally *supra* Part III, Figure 1.

<sup>67</sup> See, e.g., Laurence Prusak & Don Cohen, *How to Invest in Social Capital*, 79 HARV. BUS. REV. 86, 93 (2001); ROBERT D. PUTNAM, *BOWLING ALONE: THE COLLAPSE AND REVIVAL OF AMERICAN COMMUNITY* 21 (2000).

<sup>68</sup> See *supra* Figures 1–3.

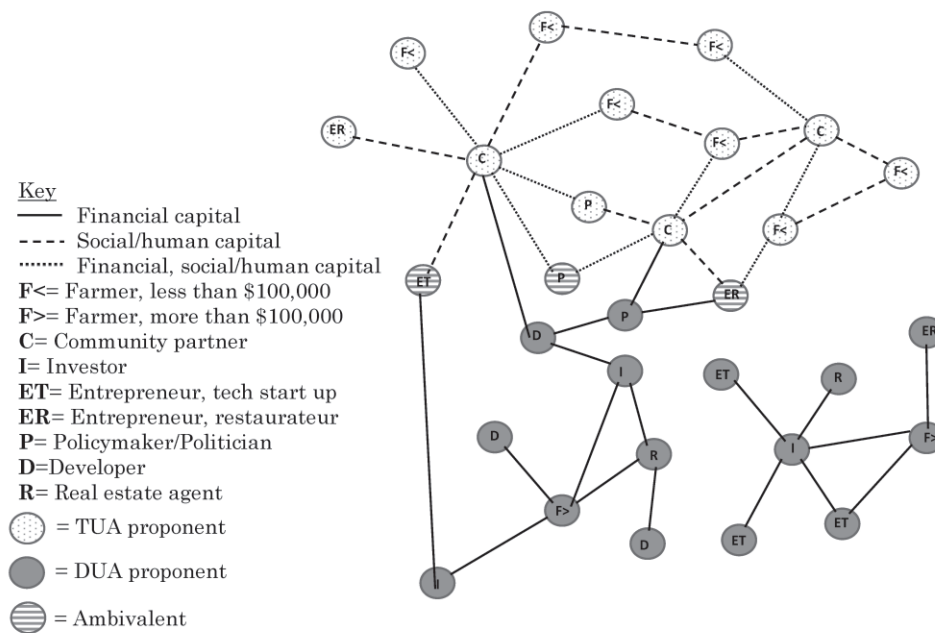
<sup>69</sup> See *supra* note 34.

element not captured in the social network data.<sup>70</sup> Non-local organizations were mentioned, too, by TUA proponents. Yet rarely did resources flow through those networks.

### C. Resources: Unequal Flows

Finally, I mapped the flow of resources between nodes in the aforementioned social networks. The images generated for the three cities were thematically similar. I will therefore only present one city: the Denver case.<sup>71</sup> The figure, as explained in the key, depicts the breakdown of flows into three categories: financial capital, which included land and credit; social and human capital; and a mix of financial and social/human capital.<sup>72</sup> These flows were determined through careful coding of the qualitative interviews and an analysis of relevant websites.<sup>73</sup>

**Figure 7:** Denver socio-organizational networks & resource flows



<sup>70</sup> See generally *supra* Figures 4–6.

<sup>71</sup> See *infra* Figure 7.

<sup>72</sup> *Id.*

<sup>73</sup> See *supra* note 34.



While the previous subsection examined *who* was connected, a focus on resource flows is meant to look at those connections in terms of *what* is exchanged through said associations. To put it another way, this analysis attempts to examine the “structure” (i.e., what they look like) as well as the “story” (i.e., what they do) of the socio-organizational networks.<sup>74</sup> Doing this adds another layer of understanding to why respondents expressed the visions and values that they did toward both DUA and TUA platforms.

A consistent theme to come out of interviews with TUA proponents—those located near the top of the figure—was that network connections were most often the result of necessity and produced dependency more so than agency. For instance, partnerships with schools were recorded in some of those stories told by this group. These partnerships were explained and justified for the educational opportunities they made possible. As one Denver farmer explained, “Partnering with schools is a great way to teach kids about where their food comes from.”<sup>75</sup> But also, farming requires that land and schools are major landowners. This also meant schools possessed a lot of influence and control in these “partnerships,” given their control over this important asset—the ground they control.

Such asymmetrical “partnerships” were also widely observed as being part of the story of networks in the lower half of Figure 7.<sup>76</sup> Relationships based on credit and investment are by their very nature asymmetrical and to a degree require the recipient (i.e., lendeer) adopt pro-economic, often at the expense of prosocial, values.<sup>77</sup> This came out repeatedly in the interviews. For example, to quote one restaurant owner who mentioned their “insane” rent and the “pressure” placed on their business model by investors:

*“I’d like to do more for my community and for my workers”—they later mentioned as an example being able to provide health care and a higher wage—but I’m under*

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<sup>74</sup> See, e.g., Nick Crossley, *The Social World of the Network. Combining Qualitative and Quantitative Elements in Social Network Analysis*, 1 *SOCIOLOGICA* 1, 18–20, 23 (2010); Fiona Dobbie et al., *Utilising Social Network Research in the Qualitative Exploration of Gamblers’ Social Relationships*, 18 *QUALITATIVE RSCH.* 207, 219–21 (2018).

<sup>75</sup> See *supra* note 34.

<sup>76</sup> *Id.*

<sup>77</sup> Michael Carolan, *Capitalizing on Financing Ecologies: The World Making Properties of Peer-to-Peer Lending Through Everyday Entrepreneurship*, 102 *GEOFORUM* 17, 23 (2019).

*insane pressure to turn a profit. . . . Creditors are reminding me of what I can and can't do."*

—New York, Restaurateur<sup>78</sup>

Meanwhile, a farmer overseeing a large, vertical DUA operation reminded me that,

*Business is about making choices. Sure, I'd like to do more for the community, donate more food, provide training opportunities for the underemployed, pay my workers better. That all sounds good. But the reality is, I've got goals to meet that are set by the people who pay my salary; people who, I suspect, are themselves under the thumb of someone else who wants to see their investments turn a profit.*

—San Francisco, Farmer<sup>79</sup>

#### IV. DISCUSSION AND CONCLUSION

What, then, do the above data tell us in terms of future trajectories of TUA and DUA? One element worth immediately highlighting is the bifurcation that appears to be taking shape in urban food systems. With the rise of DUA, we have highly capitalized farming platforms that lack important traits that had characterized even highly capitalized TUA systems, which often began as less-capitalized operations socially embedded within area neighborhoods. Instead, DUA platforms are emerging on properties that had been used (and zoned) for non-agricultural purposes. They were therefore noticeably disconnected to local, nonfinancial organizations compared to TUA systems.

Given DUA's access to capital, credit, and social networks that include actors who are part of the growth machine, it is also debatable whether DUA will follow TUA out of the urban core. Research indicates that as inner-city land prices increase, driven in part by the gentrification spurred on by urban farming systems, agriculture will be pushed "out" to less expensive peri-urban spaces.<sup>80</sup> As an intensive method of food

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<sup>78</sup> See *supra* note 34.

<sup>79</sup> *Id.*

<sup>80</sup> Hans Westlund & Pia Nilsson, *Agriculture's Transformation and Land-Use Change in a Post-Urban World: A Case Study of the Stockholm Region*, J. RURAL STUD. 1, 6 (2019).

production, the economics of DUA might be different enough to make drawing parallels between the two platforms difficult. “Plenty, for example, claims it can grow the same amount of lettuce, herbs, and greens as an outdoor farm using 350 times less land.”<sup>81</sup> In other words, they claim a one-acre DUA system produces the equivalent as a 350-acre TUA system.<sup>82</sup> When asked about their yields, farmers interviewed responded by giving figures that suggested a multiplier of between five and ten—not several hundred.<sup>83</sup> Those systems, in other words, were producing at rates five to ten times greater than national average yields for traditional outdoor farm systems.<sup>84</sup> That heightened production intensity, coupled with tax breaks and other financial incentives, like reduced utility rates in a few cases—made possible by those aforementioned connections to the urban pro-growth elite—shows why DUA might even be viewed as different in kind from TUA.

One example where these differences are playing out is through zoning. Zoning is a complex regulatory system, which in recent decades has become increasingly flexible to encourage best use.<sup>85</sup> DUA is able to use that flexibility to its advantage.

So-called Euclidean zoning speaks to the traditional system, whereby land use is regulated to single uses separated by impact types—e.g., Residential, Commercial, and Industrial (this system also contributed to the ruralization of farming).<sup>86</sup> Most zoning codes are not purely Euclidean and include types such as performance or impact zoning, which allows for variances when a set of standards can be met; incentive zoning, which allows exceptional uses that can be shown to provide significant benefits for the local community; and form-based zoning, where land development seeks to achieve a specific urban form (e.g., balancing

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<sup>81</sup> Dan Blaustein-Rejto, *Don't Count Out Vertical Farms*, THE BREAKTHROUGH INST. (Jan. 30, 2018), <https://thebreakthrough.org/issues/food/vertical-farms-raise-yields-but-what-about-emissions> [https://perma.cc/4PK6-HTUQ].

<sup>82</sup> Adele Peters, *Has This Silicon Valley Startup Finally Nailed the Indoor Farming Model?*, FAST CO. (May 18, 2017), <https://www.fastcompany.com/40420610/has-this-silicon-valley-startup-finally-nailed-the-indoor-farming-model> [https://perma.cc/TM58-TJ8U].

<sup>83</sup> See *supra* note 34.

<sup>84</sup> *Id.*

<sup>85</sup> See, e.g., Diana Budds, *Will Upzoning Neighborhoods Make Homes More Affordable?*, CURBED (Jan. 30, 2020), <https://archive.curbed.com/2020/1/30/21115351/upzoning-definition-affordable-housing-gentrification> [https://perma.cc/49EQ-FMCG].

<sup>86</sup> Michelle DiFranco, *Urban Farming: Benefits and Zoning Challenges*, BURNHAMNATION-WIDE (Sept. 28, 2017), <https://www.burnhamnationwide.com/final-review-blog/urban-agri-culture-sustainability-zoning-codes> [https://perma.cc/XL2K-8L2U].

historical preservation with new construction and the creation of green space).<sup>87</sup> These non-Euclidean options are more flexible and allow for variances or for the complete removal of some restrictions.<sup>88</sup>

Although we have seen changes in urban zoning patterns to accommodate farming thanks to the urban agriculture movement, zoning remains a gray area when it comes to DUA.<sup>89</sup> Some respondents talked about how DUA operations could be talked about in ways that placed them within *existing* zoning designations when pitched to city planners.<sup>90</sup> This stands in contrast to TUA systems, which in some cases had to seek out *changes* to zoning laws to accommodate their practices. One TUA farmer in San Francisco talked about “zoning funny business” when trying to explain why a large Plenty-like platform was allowed to operate in a part of the city not zoned for agriculture.<sup>91</sup> A real estate agent in New York, when asked to explain how zoning works for DUA platforms, saw the systems as being qualitatively different from TUA.<sup>92</sup> As she explained, “I think the fact that we’re talking about a high-tech form of food production—I don’t even like to call it ‘agriculture’ to push the idea that it has more in common with Silicon Valley than, oh, I don’t know, the Corn Belt.”<sup>93</sup> The view that these systems are qualitatively different from each other speaks to the divergence in how TUA and DUA were viewed by respondents, illustrated in the aforementioned heat map.<sup>94</sup> Recalling that figure, these systems *were* treated as being different in kind, by both groups. That difference explained why respondents either viewed TUA as a long-term solution to urban ills or DUA as that enduring panacea.

In conclusion, this study seeks to further unpack our understanding of urban agriculture by exploring some of the differences between TUA and DUA through the eyes of their respective supporters and the social networks they inhabit. The findings, though, are tentative. Next steps for future research should include, for instance, alternatively structured real estate and labor markets. These three cities were home to markets with rising land prices and low levels of unemployment, at least during the

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<sup>87</sup> *Id.*

<sup>88</sup> *Id.*

<sup>89</sup> 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, 285–86 (2017).

<sup>90</sup> See *supra* note 34.

<sup>91</sup> *Id.*

<sup>92</sup> *Id.*

<sup>93</sup> *Id.*

<sup>94</sup> See *supra* Section III.A, Figure 1.

study period.<sup>95</sup> I would also recommend taking a deeper dive into the social networks. While there are a number of excellent, empirically “thick” ethnographic accounts of urban food systems, more work is needed to map relevant social networks and the flow of resources through these connections.<sup>96</sup> Finally, this Article highlights the growing heterogeneity across urban agriculture platforms and suggests the analytic of DUA/TUA as one possible organizing frame around which to talk about these different forms.

Additional future research on this topic is needed given the tensions highlighted above. DUA looks to even further complicate the urban agriculture picture. Now that metro food systems are taking shape in ways that lead some of their proponents to claim, “I don’t even like to call it ‘agriculture’”<sup>97</sup>—we have to ask how these forms converge and diverge from TUA.

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<sup>95</sup> Aldo Svaldi & John Aguilar, *Colorado’s Historically Low Unemployment Rate Might Be Too Much of a Good Thing as Labor Shortage Puts Squeeze on Businesses*, DENVER POST (Jan. 26, 2020), <https://www.denverpost.com/2020/01/26/colorado-low-unemployment-labor-shortage-businesses/> [<https://perma.cc/GRU6-DR6M>]; Aldo Svaldi, *Property Values Take Another Leap Higher Across Metro Denver*, DENVER POST (Apr. 25, 2019), <https://www.denverpost.com/2019/04/25/metro-denver-property-values-rise/> [<https://perma.cc/F9PL-BXTV>]; Patrick McGeehan, *A Million Jobs Lost: A ‘Heart Attack’ for the N.Y.C. Economy*, N.Y. TIMES (Dec. 22, 2020), <https://www.nytimes.com/2020/07/07/nyregion/nyc-unemployment.html> [<https://perma.cc/8W8W-3NZ9>]; Jeff Andrews, *NYC Home Prices Nearly Doubled in the 2010s. What Do the 2020s Hold?*, CURBED N.Y. (Dec. 13, 2019), <https://ny.curbed.com/2019/12/13/21009872/nyc-home-value-2010s-manhattan-apartments> [<https://perma.cc/2T44-LKLL>]; Roland Li, *California, SF Unemployment Rates Fall to Record Lows*, S.F. CHRON. (Oct. 18, 2019), <https://www.sfchronicle.com/business/article/California-s-unemployment-rate-falls-to-record-14544719.php> [<https://perma.cc/P595-78PR>]; Roland Li, *SF is One of the Most Expensive Places in the World to Build Housing. Here’s Why*, S.F. CHRON. (Dec. 8, 2019), <https://www.sfchronicle.com/bayarea/article/SF-is-one-of-the-most-expensive-places-in-the-14888205.php> [<https://perma.cc/4TEJ-CX5E>].

<sup>96</sup> *E.g.*, KRISTIN REYNOLDS & NEVIN COHEN, *BEYOND THE KALE: URBAN AGRICULTURE AND SOCIAL JUSTICE ACTIVISM IN NEW YORK CITY* (2016); GARRETT M. BROAD, *MORE THAN JUST FOOD: FOOD JUSTICE AND COMMUNITY CHANGE* 10–13 (2016).

<sup>97</sup> See *supra* note 95 and accompanying text.