

# Architectural Nodes within Chicago's Urban Agricultural Food Network

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Chicago's history and urban development have been connected to its role as a food hub and driver of technological innovations in the food industry. In the 1970s, the city started redefining its relation to agriculture by integrating various forms of urban agriculture. Today, the city is known for its strong network of community gardens, educational farms, and job training programs. Over the last decade, the city has also attracted various entrepreneurial controlled environment production facilities, such as hydroponic greenhouses, rooftop greenhouses, and vertical indoor farms using innovative growing methods and economic models. Other urban farms deploy hybrid models that combine a robust social agenda with emerging, economically-driven food production systems. These multi-layer urban agriculture operations with strong community and commercial objectives contribute to community empowerment and urban revitalization.

This comparative analysis concludes a three-part mixed-method investigation of Chicago's foodshed and urban agriculture networks, which move in scale from the Metropolitan region, City of Chicago, and organizational networks to this smallest scale of specific physical locations and architectural spaces. The investigation relies on publicly available datasets and online data collected by the author. It analyzes urban agricultural networks through (1) GIS-based mapping; (2) a review of organizational structures; and (3) an analysis of critical building projects, with a focus on the award-winning Farm on Ogden in the North Lawndale neighborhood and The Plant in the Back of the Yards neighborhood. This analysis of pioneering projects may inspire other community-minded projects and cities to establish innovative pathways. The identified novel approaches will help legislators, community leaders, planners, and architects to provide for growing urban populations, create common spaces, develop frameworks to support regionally sustainable food production, promote

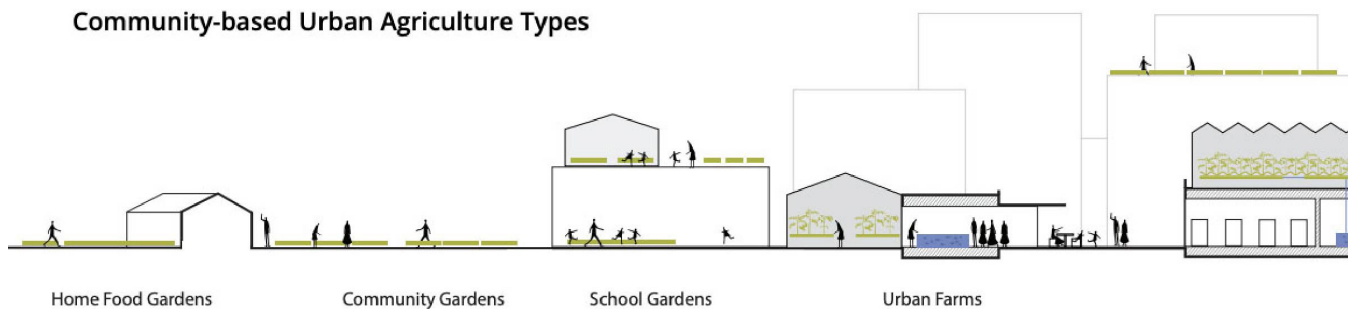
social equity, and improve the well-being of historically marginalized communities.

## INTRODUCTION

Chicago's history has been connected to agricultural production and its role as a center for technological innovations in the food industry.<sup>1</sup> It emerged in the 1800s as a food hub and shipping terminus in the Midwest that provided the growing urban centers along the East Coast with food.<sup>2</sup> Today, the city is known for its strong urban agriculture networks of home gardens<sup>3</sup>, community gardens, school gardens, educational farms, and related job training programs.<sup>4</sup> The non-profit Advocates for Urban Agriculture was one of the groups that helped establish these networks.<sup>5</sup> The organization strives to "empower urban growers to foster thriving communities through sustainable agriculture and equitable food systems."<sup>6</sup> Urban agriculture offers strategies that foster economic development, increase and sustain access to healthy food, and prevent obesity and diabetes.<sup>7</sup> Chicago Botanic Garden's Windy City Harvest (WCH) department has run urban agricultural-related outreach and educational programs since 2003.<sup>8</sup> It inspired many other programs such as Growing Home, Chicago Lights Urban Farm, and Urban Growers Collective.<sup>9</sup> Over the last decade, the city has also attracted various entrepreneurial urban agriculture operations featuring innovative production. These farms use Controlled Environment Agriculture (CEA), such as hydroponic greenhouses (MightyVine, BrightFarms), rooftop greenhouses (Gotham Greens), and vertical indoor farms (FarmedHere, Gills and Greens, Wilder Fields). Within Chicago's rich culture of urban agriculture emerged a hybrid type that combines community-based and entrepreneurial approaches, such as the Farm on Ogden as part of the WCH network and The Plant. These operations capitalize on the benefits both dimensions of urban agriculture can generate.

This study is part of a more extensive investigation that assesses the locations of these various types of urban agriculture within the City of Chicago, the demographics of communities they serve, and the interconnected networks the different types generate. Based on city-wide findings, this study identifies two case studies, the Farm on Ogden and The Plant, as outstanding examples that combine non-profit and for-profit objectives in

### Community-based Urban Agriculture Types



### Commercial and Controlled-Environment Urban Agriculture Types

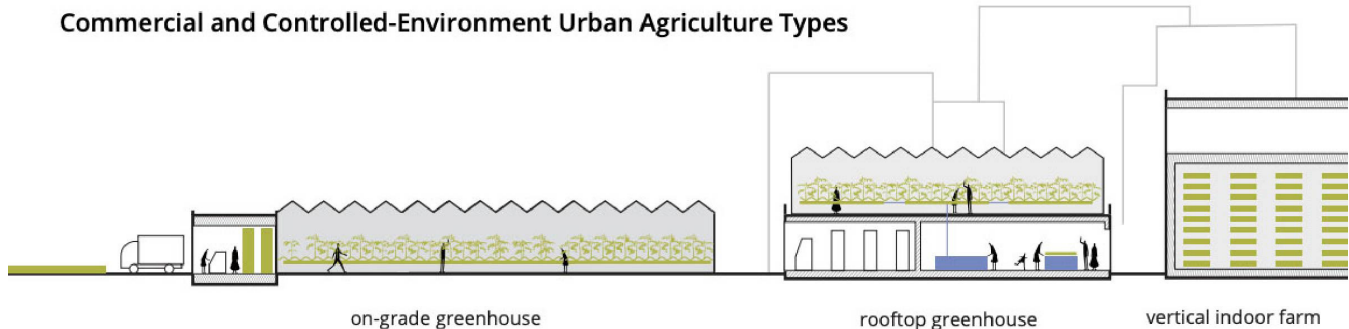


Figure 1: Types of urban agriculture in Chicago: home gardens, community/ educational gardens, urban farms, and commercial CEA operations. Drawings by author, images a) cc creative commons, b)-e) Chicago Botanical Garden, f)+g) stock photos, h)+i) Gotham Greens, and j) Farmhere.

their mission and operation. The Farm on Ogden integrates community center programs with a commercial kitchen, professional food production systems and greenhouse, and food processing infrastructure. The Plant is a for-profit food business incubator that combines food production and research spaces. Due to the significant public interest, the company set up a parallel non-profit arm to conduct outreach, tours, educational programs, and research.<sup>10</sup> Both case studies include aquaponics, the combination of hydroponic and aquaculture cultivation methods as educational tools and an

emerging sustainable food production method, as one of their growing systems.<sup>11</sup>

The two selected multi-layered urban agriculture operations with solid social and commercial objectives contribute to community empowerment and urban revitalization of underserved neighborhoods. In addition to their multi-purpose setup, both facilities integrate CEA and soil-based growing and are located in outstanding architectural adaptive reuse projects. This study aims to identify and compare strategies the two organizations used to build their successful



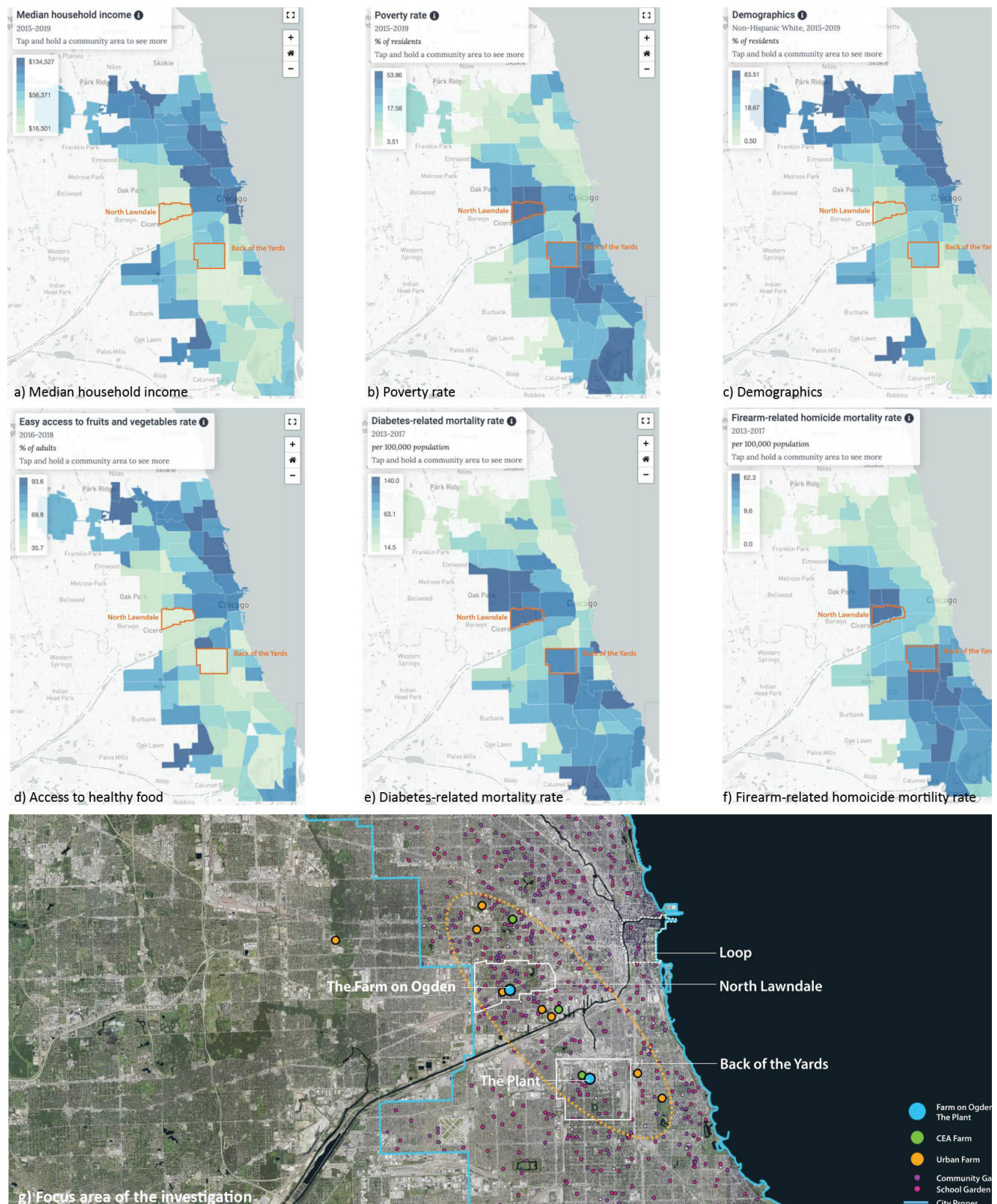


Figure 2. Demographic and socioeconomic background of neighborhoods in which the Farm on Ogden and The Plant are located. Maps a) - f) have been generated with the online tool Chicago Health Atlas, <https://chicagohealthatlas.org/>. Map g) has been created with QGIS using data collected by CUAMP and the author (see <sup>16, 17, 18</sup>). By the author.

operations and analyze how the unique architectural spaces contribute to their success. The hypothesis is that connecting a social and entrepreneurial mission and creating a place with a robust architectural identity as node in the agricultural network strengthens their operation and supports their long-term success.

## RESEARCH DESIGN AND METHODOLOGY

This comparative analysis of two case studies concludes a three-part mixed-method investigation of Chicago's foodshed and urban agriculture networks, which examines the potential for urban integration and scaling up of sustainable food production systems.<sup>12</sup> The National Science Foundation-funded investigation<sup>13</sup> aims to document the current state of urban agriculture in Chicago by revealing where the different types of operations are located within the metropolitan foodshed using different urban food mapping approaches. It determines which factors and urban contexts are needed for each type of operation to thrive and how the various forms of operations are connected. Part 1 of the investigation focuses on the collection of GIS-based location data of existing urban agriculture operations and the definition of urban agricultural types.<sup>14</sup> The dataset includes (1) locations of home gardens (n=4429),<sup>15</sup> (2) an expansive network of community and school gardens (n=826),<sup>16</sup> (3) urban farms (n=64),<sup>17</sup> and (4) an emerging network of commercial CEA operations (n=12).<sup>18</sup> Part 2 is an analysis of the network and operational structures of educational programs and entrepreneurial start-ups that primarily use aquaponics. The qualitative analysis is based on interviews with key informants; representatives of WCH and The Plants have been included in the interviews.<sup>19</sup> Part 3—this study—is an in-depth case study investigation of two organizations and facilities, the Farm on Ogden and the Plant, which stood out in analysis steps one and two. The comparative analysis of the two building projects is based on data collected through a literature review<sup>20</sup> and interviews conducted in part two.<sup>21</sup> The analysis of the building sites and their urban context has been further supported by a neighborhood-based GIS assessment.<sup>22</sup>

## COMPARISON OF TWO INNOVATIVE NODES

The goal of the comparison is to work out important parallels and identify relevant strategies for built environment experts to analyze, plan, develop, and design similar facilities. An analysis of the source materials revealed six main topic areas which are used to structure the following assessment—mission and background, urban location, program and operations, community empowerment, financing, and ownership structure, and architectural space.

**Mission and Background**—The Farm on Ogden is the new headquarter of the Chicago Botanic Garden's WCH and was completed in 2018.<sup>23</sup> This joint project with the Lawndale Christian Health Center (LCHC) aims to support an underserved urban community through food, health, and jobs. The Farm

on Ogden offers a place and services centered around urban agriculture, a "whole person" approach to health and wellness, and various job training programs and employment options.<sup>24</sup> The project creates a physical and organizational center for WCH's programs, such as their youth farms, entrepreneurship courses, nutrition education, and partnerships with the local health center to supply healthy food to people in the neighborhood. The public-private partnership between the Chicago Botanical Garden and the LCHC shows how this project has become financially viable and sustainable.<sup>25</sup>

The Plant was founded in 2010 as an incubator to generate a collaborative community of small food businesses in a former industrial meatpacking facility while promoting circular economic principles.<sup>26</sup> The building offers production and research spaces, which currently serve over 20 tenants operating different artisan food businesses including a brewery, bakery, gelato shop, chocolate maker, three kombucha producers, and five urban agriculture operations grow with soil-based outdoor and hydroponic indoor growing systems.<sup>27</sup> Individual businesses operate with the premise of closing resource loops and reduce the waste streams in a mutually beneficial way.<sup>28</sup> The Plant was founded and financed by Bubbly Dynamics LLC, a social enterprise business incubator whose mission is to support the redevelopment of old industrial buildings in disinvested communities.<sup>29</sup> The non-profit Plant Chicago complements this social enterprise with educational and outreach programs, farmers markets, and a local small business circular economy network.

**Urban Location**—Both operations are located on Chicago's West Side and Southwest Side, neighborhoods west and southwest of Chicago's downtown area, the Loop. The Farm on Ogden is located in the North Lawndale (NL) neighborhood, The Plant in the Back of the Yards (BY) neighborhood. The two urban areas share a similar socioeconomic profile. NL is considered one of Chicago's most impoverished and violent West Side neighborhoods.<sup>30</sup> Socioeconomic indicators show that both neighborhoods struggle; NL's median household income is in the 25th percentile, and BY's is in the 33rd percentile compared to Chicago's 77 communities (Figure 2).<sup>31</sup> In NL, 38 percent of the residents live in poverty, more than double Chicago's overall poverty rate (18 percent).<sup>32</sup> In BY 25 percent of the residents live in poverty. Health indicators show similar inequities as easy access to fresh fruits and vegetables and the diabetes rate. Around 14 percent of the residents in both neighborhoods have diabetes,<sup>33</sup> a rate that exceeds that of the United States (8.2 percent).<sup>34</sup> In addition to these grim statistics, NL is also one of the neighborhoods with the highest rate of gun violence measured in the rate of related homicides. Racially divided demographics parallel these inequitable statistics in most neighborhoods in Chicago; for example, 95 percent of NL's population identifies as not white, and 78 percent in BY. The Black community predominantly



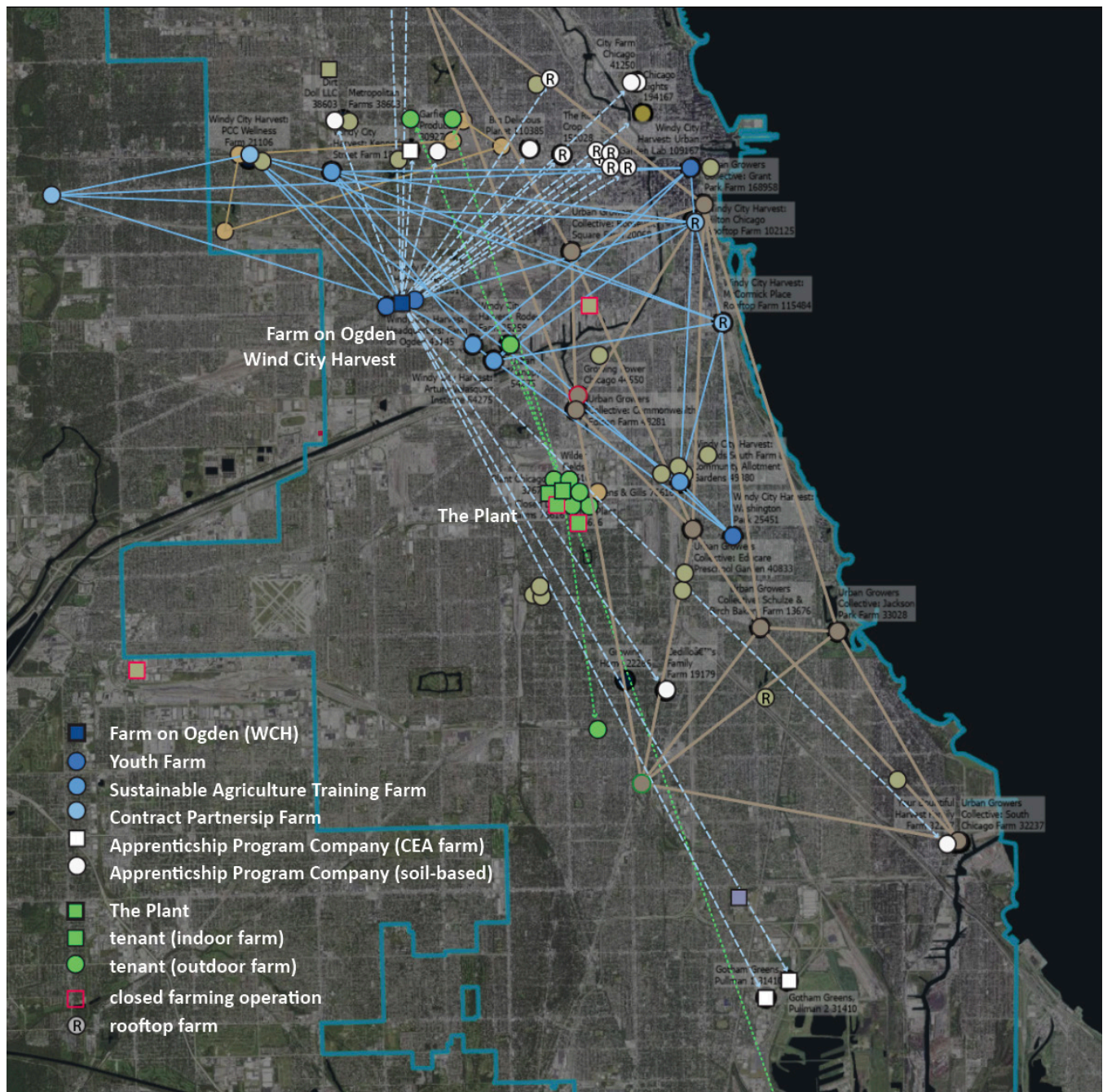


Figure 3. Interconnected networks of urban farms and Controlled Environment Agriculture (CEA) in Chicago. By the author.

experiences poverty; 37 percent of this group lives below the poverty line.<sup>35</sup>

Urban agriculture has long been associated with the potential to provide manifold benefits to underserved and disadvantaged communities.<sup>36</sup> An initial GIS-based mapping of community-based urban agriculture projects and school gardens reveals that school gardens are equally distributed throughout the city proper of Chicago. In contrast, community-based gardens can be found more frequently in underserved neighborhoods.

The Farm on Ogden and The Plant are part of a large cluster of educational and commercial urban farms situated southwest of the Loop. These farms provide healthy food, wellness education, job training and paths towards employment, keep youth out of crime, help reintegrate justice-involved individuals, and offer other social programs that help support the neighborhoods in need.<sup>37</sup>

Program and Operation—The Farm on Ogden and The Plant are each the center of a network of urban farms and food

production operations each, though the two networks are very different. WCH has established a physical network of farm sites that spans the entire city, including Youth Farms, Sustainable Agriculture Training Farms, Contract Partnership Farm, and companies that offer apprenticeships to WCH's students (Figure 3). The Farm on Ogden is the headquarter that manages the farms, dispatches students and educators, and processes, packages, distributes, and sells most of the harvested produce. It is WCH's flagship location and combines its main programmatic components,<sup>38</sup> such as an indoor market, classrooms, and office space for the management. The farm operates a greenhouse with an aquaponics system that provides fresh produce year-round, an outdoor garden, a food aggregation space, a commercial and teaching kitchen, and the infrastructure to dispense food as medicine.<sup>39</sup> The entrance and parking plaza function as a public gathering space and farmers' market (Figure 4a).<sup>40</sup>

The Plant's network and synergetic relationships evolve primarily within the 100,000-square-foot building and on its 3-acre site.<sup>41</sup> As a food business incubator, production site, and research facility, The Plant rents space to artisan food businesses offering low rent, low energy costs, and shared facilities, such as a tenant lounge and licensed commercial kitchen.<sup>42</sup> The exchange of physical resources and byproducts such as heat, CO<sub>2</sub>, O<sub>2</sub>, biomass, and organic waste, as well as knowledge, expertise, and collaborations between tenants, is the currency of this network, which is modeled after circular city principles (Figure 4b).<sup>43</sup> The anaerobic digester is not yet in operation, though will eventually contribute significantly to the closed-loop processes by transforming organic waste into heat and methane to provide the entire building with electricity.<sup>44</sup> Plant Chicago offers educational and outreach programs. In addition, it developed and managed marketing, volunteering, research, and the online presence of The Plant.<sup>45</sup> After operating in The Plant for eight years, the increasingly independent non-profit organization moved a few blocks west to a rehabilitated firehouse.<sup>46</sup> This separation allowed The Plant to utilize the full capacity of the building as a food production and research facility, all while allowing for scheduled tours and public interaction throughout the week. Some successful start-up tenants left The Plant to acquire more space and generate an informal network of alums.

**Community Empowerment**—The Farm on Ogden was conceived to empower the community using food. In addition to providing much-needed fresh produce, the new facility allows WCH and LCHC to offer classes that teach residents about healthy food preparation and eating habits. At the same time, the VeggieRX program delivers prescription-based food baskets with nutritionally valuable produce.<sup>47</sup> WCH educates youth and trains community members in paid programs and internships for year-round jobs in the agriculture and food industries.

As a social enterprise, The Plant creates a place for new food businesses to thrive. In addition, it hopes to empower the community by creating new green jobs in a dilapidated neighborhood, which saw much of the previously existing food industry move away. Bully Dynamics estimates that The Plant's tenants will eventually create 125 jobs.<sup>48</sup> The farmers' market established by Plant Chicago and the store selling products produced at The Plant make fresh food available in an underserved community. Both organizations take their leadership role seriously in supporting other non-profits and social enterprises to build similar operations and networks. Chicago Botanic Garden has published a toolkit that documents WCH's approaches, programs, and procedures in detail.<sup>49</sup> Bubbly Dynamics announced that it is working on a toolkit of resources to share its technical findings from the development of The Plant.<sup>50</sup>

**Financing and Ownership Structure**—The Farm on Ogden is a joint project between the community-based non-profit organization LCHC and the Chicago Botanic Garden, a public-private partnership owned by the Forest Preserve District of Cook County and operated by the Chicago Horticultural Society. The LCHC directly funded about half of the \$3.5 million project; the rest was raised by the two organizations with deep roots in fundraising and philanthropic support. The Farm on Ogden tries to cover the farm's operation cost with the sales of produce and fish. The year-round, highly efficient aquaponics system contributes significantly to this goal.<sup>51</sup> The farm sells about half of its production to restaurants as an essential revenue stream; the rest is included in the VeggieRX program and sold at a lower price to low-income communities. The participants of the various youth and job training programs are paid for their work; grants and donations primarily finance these payments. The opportunity of being trained to run the farm's professional aquaponics system gives trainees and apprentices a competitive advantage. Many CEA operators in Chicago value this exposure to system controls.<sup>52</sup>

The Plant, owned by John Edel and his company Bubbly Dynamics, is a social enterprise—a financially sustainable business created to further a social purpose. In 2010, Edel purchased the former Peer Building for \$525,000, which accounts for approximately \$5.50 per square foot.<sup>53</sup> The building was sold as a strip-and-rip because it included a lot of valuable materials, such as stainless steel and fully intact infrastructure systems. Instead of selling the materials and demolishing the building, Edel turned The Plant into an ambitious adaptive reuse project that recycled and reused most of the material found in the building. By 2014, the project had raised approximately \$2 million in local and state grants, \$65,000 through Kickstarter, received substantial in-kind support from volunteers, and started earning rent from its tenants.<sup>54</sup> The estimated total cost of \$6.5 million for the re-development of The Plant has been incrementally funded and constructed, and over the last ten years, one tenant or





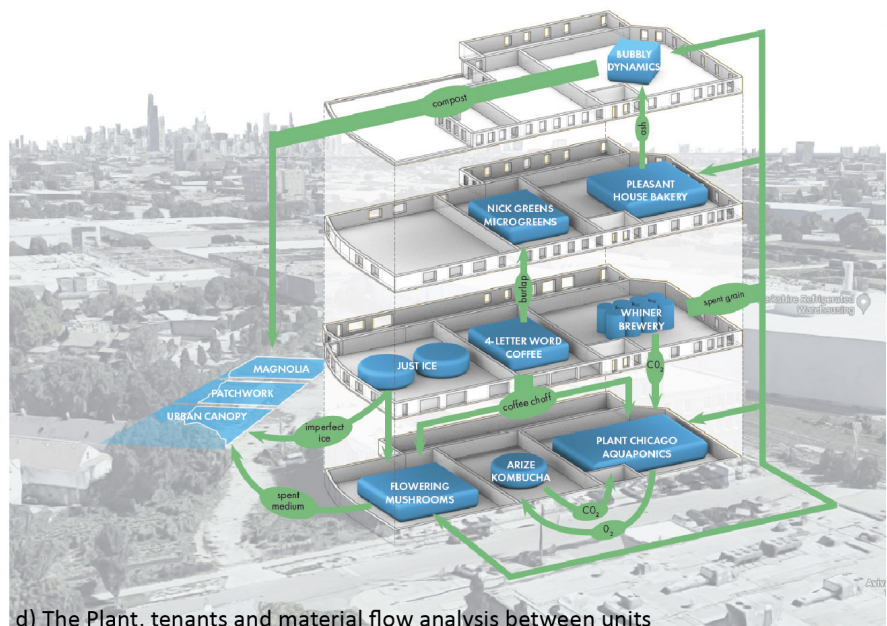
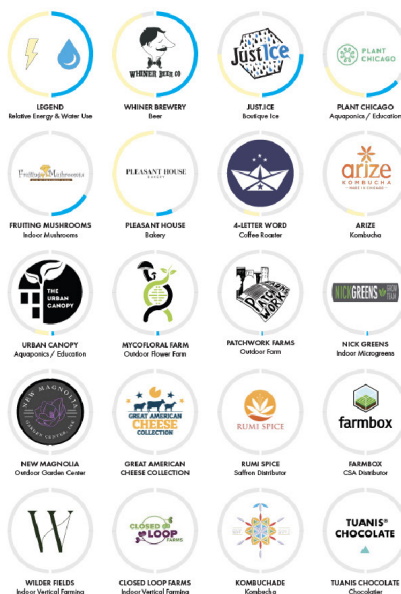
a) The Farm on Ogden, view from northwest



b) The Plant, view from southwest



c) The Farm on Ogden, ground floor plan



d) The Plant, tenants and material flow analysis between units

Figure 4: Comparison of two case studies: a) the Farm on Ogden (photo: Booth Hansen) and b) The Plant (image: Google Earth); c) Farm on Ogden's ground floor plan (Booth Hansen); d) axonometric analysis drawing of the Plant (Will Prescott and Justin Roberts.)

production space at a time. The Plant is now fully financed by the leases of tenant businesses.<sup>55</sup> The parallel creation of for-profit and non-profit arms allowed financial separation. Plant Chicago was one of the tenants in The Plant before moving to its new location in the same neighborhood.

**Architectural Space**—Both projects are remarkable adaptive reuse projects in their own right and archive a high level of quality in their design. The Farm on Ogden emerged as an award-winning project through the collaboration of LCHC and Chicago Botanic Garden as clients and the Chicago-based firm Booth Hansen.<sup>56</sup> It is the renovation of a one-story masonry building with a bowstring truss roof on one of WCH's existing Youth Farms' sites. The farm occupies part of a triangular site between the central atria Ogden Avenue (the historic U.S. 66) and the CTA Pink Line, an elevated commuter rail line. In this very exposed context, the farm acts as a beacon at night with a magenta glow of the grow lights in the greenhouse. A screen wall with large signage along Ogden Avenue acts as a billboard for the farm and showcases the view into the greenhouse revealing the aquaculture tanks prominently on street level to passersby (Figure 5a).<sup>57</sup> The transparency continues on the inside of the building. The indoor market and classroom programs occupy one ample space and connect through glass doors to the greenhouse with the aquaponics system.<sup>58</sup>

The Plant is reusing the 1925 Peer Building. This three-story brick warehouse building was used to process pork; 70 percent of the building was highly insulated for cooling purposes. The building complied with food safety regulations; therefore, much of the meat processing equipment and materials could be reused in the rebuilding process (Figure 5f). The prior function allowed for easier adaptive reuse of the building into a hub for local food production and business incubation. This was financially advantageous and environmentally sound regarding material cost and consumption. This approach is an excellent showcase of the Circular City principles regarding building materials, which The Plant aims to promote in all its work. The owner and industrial designer, John Edel, led the re-development and design of the project in collaboration with local architecture firms. The process stretched over ten years in more or less iterative phases, recovery and creation of an inventory of existing construction materials, significant building-wide refurbishment projects, and then detailed development of one area or space of the building at a time. This incremental approach allowed for complex adaptive reuse design work and design modifications as the overall operation of the building became clearer.

## TAKEAWAYS

The Farm on Ogden and The Plant analysis shows how thoughtfully developed building projects can reinforce and manifest the mission of non-profits and social enterprises. In the best case, these buildings become symbols for the empowerment of communities that these organizations

support. The two facilities and their associated programs create a strong sense of identity in their respective dilapidated neighborhoods that have otherwise seen little investment. Through their strong physical presence, both buildings are able to connect multiple layers of the organizations' missions. The collaboration of WCH and the LCHC connects food, health, and jobs. The Plant features food production, innovations, and job creation, while Plant Chicago contributes to outreach and education. Activities, interactions, and programs primarily empower and support communities, though the buildings play an essential role in giving these activities a place. Residents can identify with and meet at this location, and an esteemed, cherished, and well-maintained physical structure contributes to the longevity of programs and supports infrastructures. The following three overarching aspects significantly contribute to the success of the two projects and should be considered in future projects.

**Building (on) Networks**—In planning their new center or primary location, the organizations either built on existing solid networks of social support (in the case of the Farm on Ogden) or identified a missing network that the organization (The Plant) was able to establish. The Farm on Ogden sits strategically in the intersection of two robust and well-established support networks—the LCHC as a local health care provider and WCH that offers access to food and job training programs. Both parent organizations have excellent organizational, financial, and fundraising infrastructure and experience. With this robust backing, the partnership can advance the innovation that brought the two partners together. Their joint venture highlights the essential connection between health and food and disseminates it through creating various focused educational programs and establishing the VeggieRX program.

Whereas, The Plant seized the opportunity to create a new network and establish a place for this network to grow. Before co-working spaces were widely available, The Plant translated the idea of a communal workspace into the food industry. While the tenants rent their own production space, they share amenities such as the tenant lounge and a shared commercial kitchen and expertise, which empowers startup businesses. Through the vehicle of a non-profit organization, this group connected with the local community through outreach, providing locally produced food, and offering jobs. The well-organized non-profit Plant Chicago reached an even larger community through social media outreach, branding, and public relations efforts.<sup>59</sup>

**Intersecting Strategies**—Both projects show that integrating complementary non-profit and for-profit approaches advance and benefit their development. The Farm on Ogden is primarily a non-profit operation funded by grants and philanthropy, though WCH integrates a professional aquaponics system to grow more food year-round. This addition allows the organization to sell for-profit food to cover the farm's operation cost and offer trainees and apprentices the opportunity to





Figure 5: Detailed views of the Farm on Ogden: a) street façade, indoor community market, aquaponics system (photos: Booth Hansen). Interior views of The Plant: b) adapted reused of smoker chambers, restaurant, original concept diagram (photos and diagram: The Plant.)

train in a professional environment. The Plant, however, is primarily a for-profit operation with Bubbly Dynamics as the developer and landlord for food startups. After the building was purchased, the parallel inception of the non-profit Plant Chicago helped reinforce its social enterprise mission and created an enormous impact.

Creating Transparency—Transparency is essential to generate interest, visibility, and trust in the community the organization intends to serve. The Farm on Ogden is a powerful example of literal transparency to connect the different programs within the building and with the public outside. The indoor market, education spaces, and production greenhouse are visually connected and allow passersby to look in through storefront windows. The Plant is physically the opposite. The massive well-insulated brick building will enable users and visitors to only experience one space at a time. Foreseeing this limitation and anticipating the incremental construction process of the building's transformation, John Edel and Plant Chicago started early to communicate the ideas and concepts The Plant intended to use through a conceptual drawing. This diagrammatic drawing of closed-loop systems and circular city principles became an iconic image in its own right. The power of simplification and conceptualization generated transparency and a shared understanding of The Plant that advanced its notoriety.

## CONCLUSION

The analysis of the two organizations shows that their success is intrinsically connected to their site and the architectural space they occupy. In both cases, the physical space evolved in conjunction with operational innovations, programmatic couplings, found site opportunities, and design ideas. This confluence created the unique identity of each operation as a vital node in the city-wide urban agriculture network. The importance of the physical location and architectural space also indicates that architects, designers, and other allied disciplines are essential to support underserved communities through their work. Built environment experts have an important role in helping non-profit operations develop alternative programming, innovative operational strategies, and financing models while selecting potential suitable sites and buildings for adaptive reuse before starting to design the physical space. By embracing communities holistically, design professionals help form new partnerships and collaborations to create outstanding community spaces that make a difference for communities. Further research and interviews with practitioners are needed to document recommended approaches to co-creation with non-profits, philanthropists, and communities. This expertise will help to create more spaces that manifest the social and entrepreneurial mission of non-profits and social enterprises, strengthen their operation, and support their long-term success.

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