INTEGRATING URBAN AGRICULTURE INTO BROWNFIELD DEVELOPMENTS: A CASE STUDY OF CABOT KOPPERS, GAINESVILLE, FL

By

JOHN GOEMAN

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To my ever-supportive family
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<td>AMI</td>
<td>Area Median Income</td>
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<tr>
<td>APA</td>
<td>American Planning Association</td>
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<tr>
<td>BFPP</td>
<td>Bona Fide Prospective Purchaser</td>
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<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, Liability Act</td>
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<td>CMAP</td>
<td>Chicago Metropolitan Agency for Planning</td>
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<td>CRA</td>
<td>Community Redevelopment Agency</td>
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<td>CSA</td>
<td>Community Supported Agriculture</td>
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<td>DVRPC</td>
<td>Delaware Valley Regional Planning Commission</td>
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<td>EDA</td>
<td>Economic Development Administration</td>
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<td>EPA</td>
<td>Environmental Protection Agency</td>
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<td>FDACS</td>
<td>Florida Department of Agriculture and Consumer Services</td>
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<td>FDEP</td>
<td>Florida Department of Environmental Protection</td>
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<td>FLU</td>
<td>Future Land Use</td>
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<td>FLUM</td>
<td>Future Land Use Map</td>
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<td>GRU</td>
<td>Gainesville Regional Utilities</td>
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<td>HUD</td>
<td>Department of Housing and Urban Development</td>
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<td>IRS</td>
<td>Internal Revenue Service</td>
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<td>MOA</td>
<td>Memorandum of Agreement</td>
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<td>NLNA</td>
<td>Northern Liberties Neighbor Association</td>
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<td>NPL</td>
<td>National Priority List</td>
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<td>PPA</td>
<td>Prospective Purchaser Agreement</td>
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<td>ROD</td>
<td>Record of Decision</td>
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<td>SNAP</td>
<td>Supplemental Nutrition Assistance Program</td>
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<td>SPIN</td>
<td>Small Lot Intensive</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>TIF</td>
<td>Tax Increment Financing</td>
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<td>Urban Agriculture</td>
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<td>USDA</td>
<td>United States Department of Agriculture</td>
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<td>VCP</td>
<td>Voluntary Cleanup Program</td>
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By

John Goeman

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Chair: Abhinav Alakshendra
Cochair: Ilir Belijeri
Major: Urban and Regional Planning

This thesis explores the strategies for integrating urban agriculture into brownfield sites that addresses urban decay and fosters economic and community development surrounding the Cabot Koppers Brownfield Site in Gainesville, Florida. The Cabot Koppers site has been an unproductive and detrimental property to the surrounding community for decades and is located in a potentially valuable area for both businesses and community residents. The site has gone under cleanup and remediation efforts since the last 1970’s and is currently under consideration for development within the next few years. This study will examine the current challenges and opportunities for the site and community, as well as explore the strategies that could be implemented to improve this area.

This thesis includes the observations of the exiting socioeconomic status and built environment surrounding the Cabot Koppers Brownfield Site, as well as the current legislation and policies in place regarding brownfield redevelopment and urban agriculture in Gainesville and the State of Florida. In order to develop comprehensive recommendations for the brownfield redevelopment, comparative case studies were used and involved the evaluation of three brownfield redevelopment projects that implemented urban agriculture as their solution;
specifically investigating the strategies and methods employed to successfully redevelop contaminated areas into economic and socially viable places. The comparisons were analyzed, and recommendations were made based on the empirical literature and best practices for the brownfield redevelopment of Cabot Koppers.

Various redevelopment strategies and tools were applied throughout these three brownfield redevelopment projects, however, the overarching objectives of all the case studies were the same: to address blight and improve local food systems while fostering the emergence of new agriculture approaches. The analysis of these case studies determined legislative support, access to land, and access capital as critical components in the integration of urban agriculture. The literature presented in this study reinforces this finding and provides insight on modern programs, methods, and systems that result in more economic and socially viable places. The recommendations for the Cabot Koppers Brownfield Redevelopment are supported on this model. In addition to being economically productive, Cabot Koppers has the opportunity to transform an entire community into a socially and health conscious district.
CHAPTER 1
INTRODUCTION

Problem Statement / Justification

At the close of the twentieth century, skeletons of the industrial manufacturing industry scattered the American landscape. Manufacturing plants, that once were the cornerstone and symbol of might and self-sufficiency, deteriorated as bare reminders of a once prolific past (Perkins, 2007). The economic hardships impacted hundreds of thousands of long-time residents and while property values declined, poorer residents moved into the region to further compound poverty rates (Yacovone, 2016; Perkins, 2007). Many of these vacant, once productive industrial manufacturing sites have become known as brownfields. Brownfield sites are vacant properties left behind and undeveloped due to contaminations that complicate new development (US EPA, n.d.).

According the US Environmental Protection Agency (EPA), estimated that there are over 450,000 brownfield sites currently in the US (US EPA, n.d.). One study of the 31 largest cities in the US estimated that there are over 75,000 formerly industrial brownfield sites in these US cities, on 93,000 acres. In addition, there are another 20,000 acres in the same cities in the form of residential brownfields (Simons, 1998). These estimates are conservative considering there are thousands of more cities across the US with populations over the 25,000 thresholds. Another study of 70 cities in America, estimated that on average, “15% of city’s were deemed vacant” (Bownman & Pagano, 2001) which included varies types of land such as abandoned and contaminated brownfields.

The location and effects of these brownfields is what is most concerning. “Often they are found in inner city neighborhoods, near poor, minority populations” (The Environmental Literacy Council, n.d.) and the byproduct of industrial operations. Areas surrounding
brownfields have typically become riddled with challenges such as financial losses, unemployment, and health concerns (Yacovone, 2016; Howland, 2007; Litt, Tran, & Burke, 2002). Another study emphasizes that “such dormant, underutilized properties have led to environmental and human health problems but also contributed to the problem of urban decay” (Pippin, 2009, p. 596). Urban decay may also be recognized as “blight”. Blight, according to the State of Florida, is “an area in which there are deteriorated and deteriorating structures that lead to economic stress” (Hipler, 2012). One may argue this to be a chicken-or-the-egg analysis, as in, do brownfields lead to blight and poverty or vice versa? In either case, the reality is the same.

The casual link between brownfield sites and blight have become problematic for cities and communities (Louis & Magpili, 2002). Therefore, the efforts for redevelopment should be comprehensive in their approach and positively impact not just the site but also the surrounding community.

Remediation and redevelopment of blighted, brownfield communities have been found to create new job opportunities, eliminate or mitigate health and safety hazards, and construct affordable housing (Fisher, 2003) but one manner in which to accomplish this has been through the incorporation of environmental justice; or the “fair treatment of meaningful involvement of all people” (US EPA, n.d.). “The preservation of environmental justice considerations necessitates a focus on sustainable development, which recognizes environmental, economic, and social factors in decision-making” (Yacovone, 2016, p. 204).

There are many redevelopment strategies for cities to address the impacts caused by brownfields, such as creating a park, building a commercial shopping center, or developing low-income apartment complexes. This thesis aims to identify the impacts and opportunities for brownfields within cities while proposing a development solution that is not only economically
viable but also socially and environmentally just for the Cabot Koppers community in the city of Gainesville, Florida.

Research Question and Objectives

Research Question

How to integrate urban agriculture into the Cabot Koppers brownfield site is the main question for this thesis. This thesis wants to provide an alternative, or complementary redevelopment solution that provides economic, social, and health benefits to the surrounding community.

Research Objectives

The main research objectives of this thesis are to:

- Analyze why the effects of brownfields can be problematic for cities
- Analyze the benefits and strategies for implementing urban agriculture within cities
- Recommend the most suitable strategies for implementing urban agriculture into the Cabot Koppers brownfield site.
CHAPTER 2
LITERATURE REVIEW

Brownfield Redevelopment

Definition

When defining brownfields, it is important to establish the difference between Superfund sites and Brownfield sites as they may be confused. According the US Environmental Protection Agency, Superfund sites are “uncontrolled sites or properties where hazardous waste or contamination is located” (US EPA, 2017). Brownfield sites are “real properties, the expansion, development, or reuse of which may be complicated by the presence of a potentially hazardous substance, pollutant, or contaminant” (US EPA, 2017). The difference between these two types of contaminated sites are: Superfund sites are simply the recognition of contaminated areas that pose a real threat to human health or the environment, whereas Brownfield sites typically do not pose an immediate threat to these two elements, rather they more specifically complicate the redevelopment or reuse of the contaminated sites. Brownfield sites typically pose more of an economic or social risk that impede growth and development (US EPA, n.d.). Superfund sites pertain to the cleanup of contaminated sites and brownfield sites pertain to the development of contaminated sites.

Brownfields Importance

Brownfield sites have been a persistent problem in America and has been estimated that over 450,000 such sites in the country (US EPA, n.d.). More importantly, most brownfield sites are located in cities as a byproduct of the industrial revolution. The seriousness and importance of site cleanup and remediation have only been amplified by the presence the dense populations in urban settings. “Such dormant, underutilized properties have led to environmental and human health problems but also contributed to the problem of urban decay” (Pippin, 2009, p. 596).
Urban decay, or blight, has been identified as “an area in which there are deteriorated and deteriorating structures that lead to economic stress” (Hipler, 2012). The detrimental effects of brownfield sites within urban communities can spread like a disease. Therefore, redevelopment actions can and should have a positive impact not only on the site itself but also its surrounding area. Empirical literature supports that the entire brownfield redevelopment process should consider a wider range of goals rather than just incentivizing developers to invest in such properties.

Brownfield sites can be considered great opportunities combat urban decay through the infusion of investment, opportunity, and the chance of prosperity (Eisen, 1999). The thought of vacant land in urban areas has always been appealing for developers. Potential returns on investments could be massive but when considering “environmental liability and the uncertain costs of cleanup have traditionally kept financiers at a distance” (Pippin, 2009, p. 591). With help from federal- and state-led programs, there has been some efforts to spark developers’ interest in rehabilitating these sites.

**History and Evolution of Policy**

In the late 1970’s, the American public became to be aware of the health risks associated with toxic waste dumps and forced a response from the Government. In 1980, Congress passed into law the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that was directed toward the cleaning up and protection of the environment (US EPA, n.d.). The Act established strict standards for the cleanup of contaminated properties, identified those liable for remediation costs, and established a trust fund supported by newly imposed taxes to the chemical and petroleum industries. Purchasers of the contaminated sites primarily rely on voluntary cleanup and a litigation process to recover the cleanup costs from those who were responsible for the contamination. In many cases, the federal or state
government has been the purchaser of these sites and has been able to draw from the tax generated trust fund. As state and federal resources are limited, it was essential to create a National Priority List for strategically addressing the most contaminated sites. At this point it is important to reiterate the difference between Superfund and Brownfield sites, as Brownfield sites typically do not pose health risks but rather complicate the development of a contaminated site; therefore, would most likely not qualify to receive financial support from the tax generated trust fund (Pippin, 2009).

Superfund

As previously indicated, Superfund sites pertain the cleanup of contaminated sites and as a responsive action, the EPA has created the Superfund program that is responsible for this. The program addresses the most contaminated sites and environmental emergencies in an effort to protect public health. In the following years after the program’s inception, the EPA enacted a number of amendments to CERCLA that address a broader range of environmental contamination issues such as storage tank seepage, pollution prevention, community right-to-know, development of emergency plans in case of chemical releases, increased state and citizen involvement, and more accurate measurements to assess remediation work achievement.

As the agency’s Superfund program evolved in identifying contaminated sites and establishing standards for remediation, cleanup costs soared, and site owners’ incentive declined. The fear high costs associated with properly restoring sites deterred property owners from transferring or redeveloping land altogether. This resulted in many undeveloped, unproductive lands in industrial areas. This was problematic for many cities as the industrialization movement of the late 19th and early 20th century typically centered these contaminated, industrial sites within the urban core; a place where many existing urban challenges such as inadequate housing stock, high rent, and urban pollution were on the rise. “Such dormant, underutilized properties
not only lead to environmental and human health problems but also contributed to urban decay” (Pippin, 2009). Brownfields effectively disincentivize redevelopment and amplified unemployment, poverty, and crime rates associated with urban decay. The populations immediately surrounding the brownfield sites were most affected with despair as developers avoided the “desolate and unfriendly urban landscape, along with fear of exponential environmental liability” (Pippin, 2009) that came with redeveloping these contaminated areas.

**Brownfields**

In an effort to invigorate redevelopment, the EPA enacted the Brownfields Economic Redevelopment Initiative (Brownfields Initiative) in 1993 at the federal level. The program was launched to support the redevelopment of these unproductive, contaminated lands that sat idle or abandoned (US EPA, n.d.) due to high remediation costs. The initiative is aimed at empowering states, communities, and other stakeholders to work in a more cohesive manner to investigate, remediate, redevelop brownfield sites. The Brownfields Initiative includes an array of features but most prominently highlights the following:

- Guidance for prospective purchaser agreements to limit risk
- Access to contaminated sites for pilot programs testing redevelopment methods
- Job training for pilot cleanup programs
- Efforts towards removing regulatory barriers without compromising protectiveness
- Facilitation of coordinated site assessment
- Revolving loan programs for capitalizing fund for cleanup

In addition, an initiative called the “Brownfields Showcase Communities” provides certain cities with the opportunity to become “brownfield laboratories” for environmental protection, economic development, and community revitalization (Eisen, 1999).
As the Brownfields Initiative has targeted the federal government’s effort to encourage redevelopment, the EPA also strengthened its partnership with the states through Voluntary Cleanup Programs (VCPs) to expedite the cleanup process with statutory and regulatory reforms (Eisen, 1999). To solidify the agreement, both the EPA and the participating state enter into a memorandum of agreement (MOA). The MOA “is a non-binding agreement that promotes coordination and clarifies the general roles and responsibilities between the state and a brownfield site” (US EPA, n.d.).

The program expedites the cleanup process by incentivizing landowners or developers to propose an intent to investigate or remediate the contaminated property within the state’s program. Once the investigation has been completed, the landowner or developer would remediate the site, if determined, to an EPA-acceptable standard. In exchange for the investigation and remediation, the developer would receive liability protection from the state such as no further enforcement actions, a certificate of competition, or a formal contract not-to-sue (Eisen, 1999) (Pippin, 2009).

Since the inception of the Brownfields Initiative and the Voluntary Cleanup Programs in the first half of the 1990’s, there have been an increasing number of brownfields sites across American. To further combat the growing number of brownfield sites, Congress passed the Brownfields Revitalization and Environmental Restoration Act (Brownfields Amendment) in 2002. The Act worked in two major ways (Eisen, 1999; Pippin, 2009; US EPA, 2016):

1. Provided additional funding for state and local brownfield development programs that assess and remediate contaminated sites and
2. Limited the liability of purchasers or developers under federal law which is in accordance to state cleanup programs

The additional federal funding came in the form of grants for purposes such as environmental assessments, revolving loan-funds for brownfields efforts at the state and local
level, and cleaning grants. The grants were capped at $200,000 per site assessment while state and local governments are able to receive up to $1 million for the establishment of the revolving loan-fund program.

Complementing the additional funding were exemptions that increased liability protections for “contiguous landowner defense” and the “bona fide prospective purchaser”. Contiguous landowner defense exempts adjacent landowners from liability where contamination has spread to their property but caused by someone else. Bona fide prospective purchaser (BFPP) exemption is an updated take on the prospective purchaser agreement (PPA). The PPA negotiates an agreement between the EPA and the prospective purchaser for a site-specific settlement and in return is provided government-based funding for cleanup and remediation. Provides little to no protection for the seller and are typically time consuming and costly to develop (Pippin, 2009). The BFPP exemption allows prospective purchasers reap the benefits of PPAs through a qualification process where the purchaser does their due diligence in confirming there is no discovery of contamination; therefore, bypassing the lengthy EPA involved assessment.

In addition, the amendment also addressed the overlapping efforts being conducted at the federal and state-ran programs. If a site was being pursued under the provision of state-led programs, the federal government would confirm the appropriate response actions were being taken to clean up the site and would refrain from putting the site on the NPL. The EPA would also be barred from bringing about enforcement when state’s provided sufficient evidence of response actions completed and determination of the site’s suitability for use.

Although many states had already developed their own brownfields cleanup and reuse programs, the 2002 Brownfield Amendment prompted modifications. The effect of increased transparency between the federal and state programs have further standardized the array of state
programs (Pippin, 2009). Though the initial governmental efforts did encourage a number of redevelopment projects, the number of contaminated sites continued to outpace redevelopment and remained costly and lengthy. The 2002 Brownfields Amendment built upon the Brownfields Initiative by increasing funding, liability protection, and transparency with state-led programs. This became beneficial for all those involved, especially developers and state officials and eventually resulted in an increase of response actions at the state level.

Critical Participants, Roles, and Interests

Participation from multiple parties can be crucial to the success and smoothness of any Brownfield development projects. The inclusion of as many relevant parties as possible can help ensure all perspectives are considered when devising a cleanup and development strategy. Though there is no predetermined time in which these parties should be included in the project, it would be important to identify all parties in the upfront planning to mitigate timely and, or, costly plan revisions. The EPA has categorized four different types of involved parties and their roles and interests in Figure 2-1.

It can be considered the collective overall outcome among critical participants of any Brownfield redevelopment project is to:

- Ensure the site is cleaned up properly and safe for the community and able to be redevelopment
- Clearly determine, agree, and manage any liability concerns upfront
- Effectively revitalize the blighted area into one that generates economic and community growth
- Confirm that the redevelopment will generate an appropriate return on investment

For all parties involved, there should be no question in the level in which the site should be remediated to. The cleanup and remediation efforts should bring the contaminated site should up to par as far as EPA regulations and standards and should pose no threat or health hazard on
site or within the community. Liability among all parties should also be cemented contractually, leaving the least amount of ambiguity as possible. It is believed that most the controversy and clashing of viewpoints would concern the economic and societal benefits of these projects. What may be good in the eyes of a developer may not provide much benefit for the surrounding community, and vice versa.

The Value and Benefits of Brownfield Redevelopment

The process of redeveloping Brownfield sites brings together government, communities, and other stakeholders to cleanup, remediate, and reuse otherwise toxic, unproductive lands that can be the source of blight and urban decay. Benefits can include aspects such as an increased tax base, improved economic activity, promotion of urban revitalization, increased community involvement, and environmental rehabilitation. The EPA reported the following information from their Brownfields Program (US EPA, 2018):

- In 2016, approximately $17 was leveraged for each EPA Brownfields dollar and approximately 9 jobs leveraged per $100,000 of EPA Brownfields funds
- In a pilot study, a 32-57% percent reduction in vehicle miles travelled resulted when development happened on brownfield sites rather than greenfield sites
- In the same pilot study, an estimated 47-62% reduction of storm water runoff for brownfield site development
- In 2017, a study found a 5-15.2% increase in property value within 1.29 miles when a brownfield site had been cleaned up
- When analyzing 48 of those brownfield sites, there was an estimated $29-$97 million in additional tax revenue for local governments, approximately 2-7 times the $12.4 million EPA contribution to cleanup those sites

Beyond the infusion investment that generates economic activity, the literature points to other aspects such as urban revitalization. Because of America’s vast roadway infrastructure and its obsession for the automobile, it has made it possible for developers move their projects further and further from the urban core. The attraction of greenfield development on the semi-
urban and suburban rings is due to the fact that developers do not have to deal with construction on contaminated lands, continual site remediation, access to remediation facilities and equipment, and less expensive real estate prices. Though advantages for developers, greenfield development also comes with its negative consequences such as increased urban sprawl, increased transportation pollution and traffic, and loss of greenspace. Redevelopment of brownfields within the urban core can support the process of urban revitalization, thus counteracting the negative consequences of suburban development. Revitalization within the urban can reach a higher number of residents, use existing infrastructure, mitigate travel distance, conserve public services, and preserve the natural environment surrounding cities. It has also been associated with targeting lower-income communities suffering from urban decay and blight (Pippin, 2009). The ability to redevelop within the urban core provides opportunity to create mixed use, “live-work-play” communities much like Atlantic Station brownfield redevelopment project in Atlanta, GA.

**Key Challenges in Brownfield Redevelopment**

Possibly the two most challenging hurdle with brownfield redevelopment lies within the environmental liability and financial barriers. Environmental liability comes with much scrutiny, financial obligations, and risk uncertainty; typically, not very enticing for developers and property owners. Taking on responsibility for these contaminated sites has been a huge deterrent that would need to carry throughout the time until the site is 100% remediated, possibly hundreds of years; even then, it would need outlast future lawsuits as the source of health complications to the community.

Financial barriers also pose a threat as “private lenders are often reluctant to give loans for potentially impaired lands. In some cases, cleanup costs for a property may ultimately be
more than the property’s value” (US EPA, 2015, p. 1). This is especially true as the size of the brownfield site increases, the potential impact would therefore be magnified. This is likely considering these sites were industrial lands requiring ample amount of land for operations.

Developers must also consider the timeline it will take for cleanup. Assessment and cleanup may take decades in some cases and when compared to normal development activities, it further disinterests the investment. A last consideration for redevelopment lies in the site reuse planning. Each brownfield site has its own sets of factors that make up the site’s profile, including the community’s goals and market potential. Thriving cities with an upward trend of growth and solid infrastructure have been much more attractive investments compared to shrinking cities requiring major upgrades.

Other challenges include the struggle against stigmas and restrictions invoked upon each, unique brownfield site. It can be reasonably assumed that people don’t want their kids playing in backyards with contamintes. They don’t want food grown from these sites and they don’t want “out-of-place” uses or buildings. Additionally, practically all municipalities in America have their own set of development restrictions whether that be form-based (design) or land use. These types of restrictions are commonly contested by developers in the form of a change ordinance and within reason can be approved but the matter is that they still create another barrier.

Even when community involvement is exercised, sub-challenges like reaching consensus and false promises arise. It’d be ideal to reach consensus and the immediate take is that it’s nearly impossible. So, should planners and developers’ side with the majority or act on what they believe is right? Hypothetically, if total consensus was to be reached, there is potential that promises made by developers and local officials do not always translate into said outcomes. For a number of reasons this may happen but “like an urban land use development process, is subject
to… [political manipulation] …as a resulting distrust by local resident” (Eisen, Brownfields at 20 - A Critical Reevaluation, 2007).

However, along with the potential prosperity of brownfield redevelopment, it is important not to understand the indirect consequences that may occur. Aspects such as the potential of misrepresentation of community needs and gentrification – the displacement of lower-income resident due to the influx of middle- and upper-income residents. Since most brownfield redevelopments use public-private partnerships, community involvement tends not to be required or even considered primary element within the redevelopment process (Davies, 1999). This makes it possible for redevelopments to not entirely be cohesive with community needs within the surrounding area and potentially lead to major socioeconomic shifts.

Developers must find value in the contaminated to even consider redevelopment. Once that has been determined, there are a number of challenges and barriers that will continue to work against investing. Both federal and state-led programs try to provide some liability relief and incentive to develop, it almost certainly always come down to an economic decision as to whether the economic potential can overwhelm the costs and risks to rehabilitate. “Significant opportunities exist for successful brownfield development” (US EPA, 2015, p. 1), a revitalizing idea companied with public support can be the force to overcome the challenges presented by brownfields.

**Funding**

Brownfield redevelopment typically includes many different partners from both the public- and private-sector. Funding for these redevelopments will depend on the redevelopment scenario – either private, public, or public-private – and will typically target one, some, or all, of the following three components: cleanup, remediation, and development. Outside of private investment, the government offers funding in the form of grants and tax credits through four
major entities: the EPA, the Department of Housing and Urban Development (HUD), state departments, and local municipalities. The combination of grants and tax credits have been established to entice developers rehabilitate blighted and potentially hazardous sites.

In private-led brownfield redevelopment scenarios, the “developer takes responsibility for the redevelopment process but may require some limited public investment to first define the extent of contamination” (US EPA, 2015, p. 5). After the contamination is assessed, the developer will plan for the site’s reuse. From here, the developer would seek private financing from their financial resources. Next, once the cleanup standards have been defined, the developer would execute and complete the federal and state cleanup requirements. Once the cleanup has been considered complete by the appropriate regulatory authority, the property would be ready for redevelopment (US EPA, 2015). Figure 2-2 displays the balance of funding sources for private-led redevelopments of brownfield sites.

The second type of redevelopment scenario involves at least one public- and one private-sector entity. The partnership between both sectors are formed to “combine resources and efforts to accomplish a common goal” (US EPA, 2015, p. 5). The balance of resources and effort can vary from project to project but typically the public-sector entity would support some initial funding for assessment, cleanup, and infrastructure. The private-sector entity would then take over and fund the pre-development and construction process. Though this partnership can be met with some lack of public support (tax dollars), there are some benefits for both parties. The public investments provide incentives for the private-sector get involved and the private-sector involvement reduces the financial burden of the public-sector (US EPA, 2015). The figure 2-3 displays the balance of funding sources for public-private-led redevelopments of brownfield sites.
Finally, the third redevelopment funding scenario is led by the public sector (Figure 2-4). Typically, a municipality would take responsibility of the entire assessment and cleanup process. Much like the private-led process, the municipality will come into ownership of the property, assess the contamination, and cleanup the site to regulated standards using federal, state, or municipal funding. Upon completion of the cleanup process, the municipality would either sell the property to a developer or redevelop the site itself for public use. Public reuse would typically involve the development of a public park, school, or municipal building (US EPA, 2015).

The federal, state, and local governments offer a variety grants for brownfield redevelopment projects. The most prominent grants come from the EPA’s Brownfield Program which include the Brownfield Economic Development Initiative (BEDI) grants which is administered by the Department of Housing and Urban Development (HUD). “These grants support revitalization efforts by funding environmental assessment, cleanup, and job training activates” (US EPA, n.d.):

- **Brownfield Assessment Grants** provide funding for Brownfields inventories, planning, environmental assessments, and community outreach.
- **Brownfields Revolving Loan Fund Grants** provide funding to capitalize loans that are used to clean up brownfields.
- **Brownfields Cleanup Grants** provide funding to carry out cleanup activities at brownfield sites owned by the applicant.
- **Brownfields Area-Wide Planning Grants** provide funding to communities to research, plan and develop implementation strategies for cleaning up and revitalizing a specific area affected by one or more brownfields sites.
- **Brownfields Job Training Grants** provide environmental training for residents of Brownfields communities.

In addition to these grants offered within the EPA’s Brownfield Program, there are a number of other grants that can be used for these blighted and depressed areas. The grants are
offered at all three levels of government but may vary state to state or municipality to municipality; some common grants include the Community Development Block Grants (CDBGs), Section 108 Loan Guarantees, Small Business Association’s 504 Loan, and Enterprise Zones (Mauer, n.d.). There may also be tax incentives, or reductions in development fees or tax rates which may offered by different states and municipalities. Because there is typically an association between brownfield sites and depressed areas, many brownfields could qualify for several funding opportunities.

**Urban Agriculture**

**Definition**

The North American Urban Agriculture Committee defines urban agriculture as “the production, distribution, and marketing (and disposal) of food and other products within the cores and edges of metropolitan areas” (US EPA, 2017). The most distinct aspect of urban agriculture, which differentiates itself from rural agriculture, lies in its immense integration the urban economic and ecological system. This integration includes linkages to residents as laborers, the use of urban resources (land, water, infrastructure, capital), market reach and proximity, environmental conditions, the urban food system, conflicting land uses and functions, and urban plans and policy (RUAF, n.d.). Urban agriculture itself can take many forms including some like backyard, rooftop, balcony, parks and vacant lot gardens, fish farming, livestock grazing, urban markets, beekeeping, food-production innovation, food to school programs, and more (University of California, n.d.; University of Florida, 2018).

Common urban agriculture aspects that are discussed within local government and communities are centered around community gardens, urban farming, and farmers’ markets. These three topic areas have received attention in comprehensive plans, policy and zoning, development plans, and academic literature. Community gardens area farming areas typically
managed by community groups or non-profits with the intent to produce food for local consumption. Urban farms on the hand, may be managed by for-profit or non-profit organizations that prioritize the sale of locally produced sales. The difference lies in the intent of what to do with the food after production, either purposefully selling produce or using it for personal consumption with small amounts of incidental sales (City of Chicago, 2011). Farmers’ markets serve a different purpose as they are considered places where multiple farm owners can gather to sell produce to the public and typically do not have the farming operations on the same site as the selling operations. All three of these are considered remedial aspects to the integration of urban agriculture.

**Importance of Urban Agriculture**

Farming within city limits is not something new to America. Numerous cities developed from agricultural roots. The formation of villages, towns, and cities typically began on lands with productive agricultural settings. Aside from the use of victory gardens (home gardens grew by citizens to increase food production) during WWII, urban gardens have significantly shrunk in size and permissible status over the past century. Coupled with increasing and already established high levels of urbanization, the decline of urban and semi-urban farming has become a familiar occurrence. The industrialization and mass production of the food system, in combination with more efficient and lower costing transportation, has made it possible for most cities to import their food demand and reduce their dependence on local farms. As a result of this, whatever farms typically struggle or collapse due to the development pressure and municipal regulations (Dorward, Schutzbank, & Mullinix, 2013). And urban farms aren’t the only ones feeling this pressure. Rural farms can expect the same conditions as metropolitan areas continue to expand in size, only to eventually encompass rural farms too.
To combat this trend of pushing farms further and further from the masses – while simultaneously addressing a multitude of challenges plaguing urban areas such as food deserts and access to healthy food options – citizens, advocates, NGOs, private companies, and governments are looking to urban agriculture as a solution. “For many cities, urban agriculture is seen as a strategy for business development, job training, community development, health education, democratic process, sustainable planning, and more” (Golden, 2013). Today, approximately 15% of food production worldwide is generated in urban settings (US EPA, 2017). As the level of urbanization remains high or increases, “the contribution of urban agriculture to food security and healthy nutrition is important as more and more people live in cities” (University of Florida, 2018). Growing interest for locally grown food is finding its place to homes, restaurants, and schools across America but not just as a fad. The empirical literature for the increased interest in urban agriculture has pointed to the publics’ awareness of public health issues, the benefits of green space, the importance of community development, and the economic potential of small-scale specialty farming. To strengthen the sustainability of this movement, many local governments have taken notice and adopted policies and regulations that support the advancement of urban agriculture across the country (APA, n.d.). Municipalities have gone as far as making urban agriculture and food elements a priority in their comprehensive plans (Hodgson, 2012). Municipalities are recognizing especially recognizing urban agriculture’s potential for revitalizing communities with excess vacant land and for energizing local economic activity (Hendrickson & Porth, 2012).

Expansive literature has well documented the benefits of urban agriculture. The list below provides a short summation of benefits effecting economic, social, and environmental aspects:
• Increased economic activity – productive reuse, job opportunities / training, supplemental household income, and real estate values
• Improved efficiency of food systems – food production, distribution, and waste reduction
• Increased social and health welfare – access to healthy nutrition, social capital, recreation, neighborhood inclusion, integration, and attractiveness
• Increased environmental management – energy savings, greening of the city (shade, temperature, CO2), car emissions, storm water runoff, roadway wear

The benefits of urban agriculture vastly expand beyond just food production. The incorporation of urban agriculture within communities “profoundly influences its economic and social character” (Mullinix, Fallick, & Dorward, 2012).

**Economic Impacts**

Most of the skepticism around urban agriculture is that it is not economically viable (Kaufman & Bailkey, 2001). There is existing literature in the economic impacts of urban agriculture, it is somewhat limited. One report from the University of California Agriculture and Natural Resources Competitive Grants Program has looked to consolidate the literature of economic impacts of urban agriculture. Of the 78 books and articles reviewed in the report, the most common themes associated to economic impacts included (Golden, 2013):

• Job creation, training, and business incubation
• Market expansion for farmers
• Savings on food expenditures participants
• Savings for municipal agencies
• Increased property values

The next section will summarize the main takeaways from the University of California program and integrate other findings from sources not included in the study.
Employment and business

The report included many output measurements that support argument that urban agriculture can ignite economic activity but overall, the most transferrable measurements that would be specific enough for a municipality or potential urban farmer to utilize came from two articles using economic modeling. One projected stated that transitioning to locally supplied fruits and vegetables in Michigan would result in 1,800 jobs and $211.5 million in revenue (Conner, Knudson, Hamm, & Peterson, 2008). The second one projected that urban farming may have potential to generate 26 full time jobs and nearly $2.4 million in revenue for an area in British Columbia (Moreau & Hodgson, 2012).

The literature has revealed some generalizations related to jobs and business incubation. One is that urban farms “foster entrepreneurs and provide a conduit for innovation” (Dorward, Schutzbank, & Mullinix, 2013, p. 7) and that aquaponics, vertical farming, and micro-green operation models are all new innovations gaining momentum in America. Many of the urban farming programs hire the youth and provide much needed skills training (Metcalf & Widener, 2011) for them to build upon and utilize in larger operations and professional careers. Programs focusing on food justice have typically been implemented in areas with higher unemployment rates and is considered feasible employment while providing quality food which may not otherwise be possible (Bradley & Galt, 2013). Because of the flexible nature of farmers markets, farmers are able to create devoted customer bases (Feenstra & Lewis, 1999). Furthermore, urban farming projects have found to be catalysts for entrepreneurial ventures that benefit both community and growers (Bradley & Galt, 2013).

Expanded market reach

The literature on farmers markets and community supported agriculture (CSAs) indicate that the method of “direct marketing strategies created reliable markets for small farmers”
This also coincides with that there “tends to be a larger population of foodies, supportive restaurants, and grocers that create demand for urban farming products” (Golden, 2013, p. 14). In addition, when compared to grocery stores, farmers markets attracted potential consumers from a larger range (Gale, 1997) and metropolitan marketplaces yielded higher gross sales and displayed a higher demand for value-added products (Feenstra & Lewis, 1999). It is principally important for urban farming because even though they are limited space and potential output, they are able to directly reach a larger, more stable and dedicated market than larger yielding, rural farmers who must use wholesale strategies (Kremer & DeLiberty, 2011).

**Food expenditure reductions for participants**

There was a significant amount of research supporting the economics of urban agriculture when it comes to reducing food expenditures for participants. Two different reports concluded some quantifiable savings; one reported a $475 per season savings for individual gardeners (Patel, 1991), and the other reported a $915,000 savings for an entire community garden program (Bellows, Brown, & Smit, 2005). Many urban farming and community garden programs provide tools and utilities and do not require large investments, the average cost to participants was $25 per plot (Patel, 1991).

These savings for participants can reduce household food expenditures for consumers too. One study found that CSA participants received up to a 150% price savings on comparable products at conventional grocery stores (Cooley & Lass, 1998). As mentioned, many CSA programs are implemented in lower-income neighborhoods, therefore, these household food expenditure savings become even more valuable. They provide more affordable, quality foods to those in food insecure areas (Park, et al., 2011).
Savings for local municipalities

Aside from municipalities’ intentions to improve food security and the wellbeing of their citizens, much of the literature also pointed to positive economic impact for maintaining vacant lots (Hodgson, 2012; Balmer, Mendes, Kaethler, & Rhoads, 2008). In a report by a San Francisco-based advocacy group “community management of vacant lots transformed into urban agriculture sites saved the Department of Public Works an estimated $4,100 a year per site by preventing vandalism, dumping, and labor-intensive upkeep” (SPUR, cited in Golden, 2013, p. 14).

Raised property values

The final commonality for economic impact within the 78 sources of urban agriculture found a correlation between urban farms and community gardens, on that states the gardens are linked to increasing home values and household income. With the presence of community gardens, property values raised as much as 9.4% within five years of implementation. As a result, the property value increases meant increased tax revenues for the local government, equating to an estimated $500,000 per garden over 20 years (Voicu & Been, 2008).

Social Impacts

Social impacts are the effects of something, such as a policy or action, that influences the well-being or social structure of neighborhoods. For the purpose of this paper and concurring to the information provided, social impacts will include the relationships and interactions of community members with each other and their built environment. Of the 78 sources cited in the University of California Urban Agriculture study, the following five categories were considered commonalities of social impact amongst them:

- Reduced Blight and Increased Community Attractiveness
- Access to Land
• Improved Communities and Social Capital
• Improved Access and Opportunities for Education and Youth Development
• Generational and Cultural Inclusion

Coupled with additional sources not found in this specific, the next section will highlight the major takeaways found within the literature.

**Reduced blight and increased community attractiveness**

Urban farms embedded within communities recreate and improve commonly blighted or vacant properties and overall, make the community more attractive. As a result of the community becoming more attractive, residents experienced more local pride and affection to their space (Bradley & Galt, 2013; Ober Allen, Alaimo, Elam, & Perry, 2008). The increased attachment developed these areas into safe places which were less likely to incur crime or be vandalized (Bradley & Galt, 2013; Ober Allen, Alaimo, Elam, & Perry, 2008; Teig, et al., 2009).

“Community gardens, in particular, were cited as a place where people build trust (Teig, et al., 2009), which in-turn, can lead to an increased concern for members within the community (Armstrong, 2000). Reducing blight and creating a strong sense of attachment could improve overall productivity within communities.

**Access to land**

One of the biggest combatants that has impeded cities has been access to land, there is only so much of it. Land within the city limits is often owned by corporations and private entities, thus, diminishing the amount of land available for the public. Even open, public spaces are often reserved for recreation and barred from use as economic generators. The study cites, “providing a piece of land for people to call their own for a season” (Patel, 1991), was one of the most important factors leading to successful community gardens. Since the inception of the USDA’s Community Food Project, over 50,000 acres of land was made accessible for farming
and agricultural (Golden, 2013), with approximately half of it being donated or used free of charge (Kobayashi, Tyson, Abi-Nader, & Tuckerman, 2010).

**Improved communities and social capital**

Community development and the building of social capital was the most detected effect on communities and participants. The literature emphasized the that the scope of urban agriculture went beyond just food production and had “valuable community development potential” (Golden, 2013) and could be an “agent for change” (Holland, 2011). It is to be expected that as participants become more involved with the community gardens, there would be a higher chance of interaction between one another; leading to the building of community relationships. Community gardens have effectively become places gathering and socializing (Patel, 1991; Saldivar-Tanaka & Krasny, 2004; Teig, et al., 2009). Building upon this interaction, many articles described how this further led to citizen engagement, the planning process, reaching consensus, and decision-making (Patel, 1991; Glover, Shinew, & Parry, 2005; Balmer, Mendes, Kaethler, & Rhoads, 2008; Travaline & Hunold, 2010).

“For urban farms and businesses, self-determination, self-reliance, and activism were seen as major impacts” (Golden, 2013). Projects driven by community leadership tended to lead to improved self-esteem, pride in their work, and craving to control the food resource and gain food independence (White, 2010; Colasanti, Litjens, & Hamm, 2010). As urban agriculture began to take hold and become imbedded qualities within communities, the impacts progressed onto newer, younger generations of engrossed citizens (Levkoe, 2006; Sumner, Mair, & Nelson, 2011; White, 2010). The familiarity and interaction among farmers, consumers, and residents built a sense ownership and responsibility to the food production, which further contributed to the larger sense of community (Bregendahl & Flora, 2007; Sumner, Mair, & Nelson, 2011).
Improved access and opportunities for education and youth development

It has been well documented that education and childhood experiences play major roles in the development and overall quality of one’s life as an adult. Urban agriculture provides children and adults the means for accessing learning experiences, educational programs, and personal development. A high percentage of the sources referenced in this University of California study cite projects that included component such as educational services and, or youth leadership opportunities (Krasny & Doyle, 2002; Ober Allen, Alaimo, Elam, & Perry, 2008; Kerton & Sinclair, 2009; Travailine & Hunold, 2010; Bradley & Galt, 2013). Furthering the sign of genuine interest, research found that the learning experiences often occurred organically, rather than through means of formal instruction (Kerton & Sinclair, 2009; Levkoe, 2006).

Of the many youth programs within the study, three major elements were found to be common: nutritional education, job training, and leadership opportunities (Krasny & Doyle, 2002; Ober Allen, Alaimo, Elam, & Perry, 2008). It was cited that the outcomes of these educational programs included “awareness of environmental issues and ethics, sustainability, and food systems (Golden, 2013, p. 10). This awareness led to an increase in participant’s empowerment toward activism, advocacy, social and environmental justice (Levkoe, 2006; White, 2010).

Generational and cultural inclusion

Food and meals have always been considered a universal method to bring people and societies together – no matter the age or cultural background. There are several urban agriculture projects that encourage immigrants to farm within the community gardens (Feenstra & Lewis, 1999; Balmer, Mendes, Kaethler, & Rhoads, 2008; Beckie & Bogdan, 2010). As many immigrants may have substantial agriculture experience, it has given them a chance to apply their skills and bring forth new techniques and knowledge. Furthermore, it has given immigrants
the opportunity to integrate themselves into their new communities and reflect their cultural varieties through different types of fruits, vegetables, and spices (Krasny & Doyle, 2002; Beckie & Bogdan, 2010).

The same methodology applies for people across generations. Since most gardeners are older (Patel, 1991; Schukoske, 2000; Armstrong, 2000; Teig, et al., 2009) and combined with the programs directed toward the youth, the community gardens become ideal locations for the two generations to socialize and pass knowledge. Additionally, as seniors’ transition to more dependent, smaller quartered living, urban farming becomes a productive activity that fuels their sense of independence (Armstrong, 2000).

Health Impacts

“In planning and policy, health impacts are extremely valuable for advocacy, particularly when these impacts can be tracked and quantified” (Golden, 2013, p. 11). When considering the discussion of urban agriculture, health impacts tend to be a forefront topic and the specific focus of a considerable amount of the research. The following literature support that momentum and cite the most common health impacts associated with urban agriculture.

Access to healthy foods

Urban agriculture can be an effective method for addressing food access and food insecurity, especially in low-income neighborhoods and food deserts (Armstrong, 2000; Balmer, et al., 2005; Corrigan, 2011; Gilliland & Larsen, 2009). Though it is realized that urban agriculture cannot produce enough nutritional needs for communities, it can serve as a catalyst for action and a more serious look at the comprehensive food-access strategies (SPUR, 2012). One particular farming program cited that approximately half of the farmers gave their crops back to the community (Corrigan, 2011). Food projects assessed by the Community Food Security Coalition cited an 18.7-million-pound food output with more than 725,000 pounds of
food that was donated back to communities. These food donations have been sent to soup kitchens, farmers markets, local events, schools, and more.

**Improved consumption of healthy foods**

There is literature to support urban agricultures’ ability to increase fruit and vegetable consumption (Brown & Jameton, 2000; McCormack, Laska, Larson, & Story, 2010) and consumption varieties (Sharp, Imerman, & Peters, 2002; Kerton & Sinclair, 2009; Landis, et al., 2010) among participants. Research also showed that this increased fruit and vegetable consumption extended beyond participants and included family members too. Families with a participant in a community garden program “were 3.5 times more likely to consume fruits and vegetables at least 5 times per day than people without a gardening household member” (Alaimo, Packnett, Miles, & Kruger, 2008). Consequently, these fruits and vegetables have been quality food replacements for other unhealthy, junk food options. Coinciding with the before mentioned impact of childhood experiences, the youth programs can help build healthy, sustainable eating habits for children to carry on throughout their adult life.

**Improved knowledge and awareness**

Some literature suggests that food and health literacy has been potentially more important than the actual production of food (SPUR, 2012). Naturally, through the act of farming and investment into these programs, discussions and printed information became a part of the garden and the community involved (White, 2010). The gardens and programs increase nutritional awareness and healthy cooking and eating practices (Krasny & Doyle, 2002; Levkoe, 2006; Bregendahl & Flora, 2007; Alaimo, Packnett, Miles, & Kruger, 2008).

**Improved mental and physical health**

Community gardens have become ideal locations for both physical activity and mental health (Patel, 1991; Armstrong, 2000; Saldivar-Tanaka & Krasny, 2004; Twiss, et al., 2003).
Though it may not be as rigorous as other physical activities, urban farming provides a medium for participants to engage in sustained, physical activity for some period of time. Activity that prevent diseases and other health complications (Magnus, Matroos, & Strackee, 1979).

Concerning mental health, many participants agreed that the garden and its’ plants presence reduced their stress levels and improved overall well-being (Patel, 1991; Armstrong, 2000; Teig, et al., 2009)

**Broad Spectrum Impact**

Another recent study attempted to look at the “ecosystems services” associated with urban agriculture. Services included the urban heat-island reduction, storm water runoff prevention, nitrogen fixation, pest control, and energy conservation. The study states that if urban agriculture was fully implemented around the world, the following would reasonable estimates for the impact of urban agriculture (Arizona State University, 2018; Arizona State University, 2018):

- Be able to produce 180 million metric tons of food a year – approximately 10% of the global output for legumes, roots and tubers, and vegetable crops
- Become as much as $160 billion industry annually
- Generate 15 billion kilowatt hours of annual energy savings worldwide – equivalent to nearly half the power generated by solar panels in the US
- Sequester up to 170,000 tons of nitrogen
- Prevent as much as 57 billion cubic meters of storm water runoff

It must be recognized that was one of the first studies to establish a “benchmark” for the measurement of urban agriculture on such a large scale and as so, the research would need more time to support such proclamations. Given this early insight and increasing interest for such magnitude, this could indicate baseline potential for future urban agriculture development.
Types of Urban Agriculture

There are many forms of urban agriculture that require a wide variety of functions to be formed. This thesis will cover the following four subject areas categorized as “types of urban agriculture”:

- Business
- Land Types
- Methods
- Crops

Business

The differences among urban farmers and their businesses vary given a number of factors but especially their experience and approach. Urban agriculture businesses tend to be either a socially-driven using a non-profit business model or a traditional for-profit model more typical of rural agriculture. Like other non-profit enterprises, there are often mandates that these businesses address areas such as food security, local production, and community development. Revenues from these enterprises are then invested back into the business’ operations. For-profit businesses may also address social challenges like the ones mentioned above but their primary business objectives are to make money and have their revenues go back to the owner, farmer, and operation (Dorward, Schutzbank, & Mullinix, 2013).

An urban environment may be challenging for actual food production, it is also a fruitful source for connections, opportunities, and demand. “Urban farms are often high profile and can have great potential for collaboration within the community by building partnerships with developers, the food service industry, schools, community organizations, and local governments” (Dorward, Schutzbank, & Mullinix, 2013, p. 4). Urban farms have become not only a place to do business but educational hubs for healthier growing and eating. The gardens are gaining popularity as public awareness increases for healthier food options and as local restaurants seek
to market local sourcing. Local governments have recognized the importance of healthy habits and have already been in process to establish policy and strategies that align. It has become very important for urban farmers to take a cerebral approach to align themselves and their businesses within the local food system, green economy, and community development supported by their local governments.

**Land types**

The different types of land farming can range from high density residential and commercial to low-density, agricultural within city limits. In any case, the environment and scale of production (aside from policy) become key determinants as to what facilities, production methods, and crops should be grown. Figure 2-5 helps visualize the different types of urban agriculture given their setting within the city. Table 2-1 will further identify and describe the differences among urban farming land types.

**Methods for urban agriculture**

Technology advancements have made it possible to farming in all types of locations and environments. Within the urban environment, farmers need to work with limited land space, city pollution, soil complications, water access, and interactions with urban aspects like man-made materials and systems. There will be two components covered in this section, production methods for urban agriculture and locations for production.

First, there are different methods for food production and the most significant difference between them has been the medium (or lack of) in which they grow. Traditional agriculture uses soil as its medium. Newer agriculture methods have typically used a combination of materials such as mineral wool, clay aggregate, fiber, perlite, or water. In any case, the medium’s major functions remain the same: to physically support plant growth, allow for maximum root growth,
and supply roots with necessities such as water, air, and nutrients (Maximum Yield, n.d.). Table 2-2 explains the differences between agriculture methods.

Conventional agriculture typically produces the largest yield quantities but requires expansive amounts of land, high and inefficient use of water and nutrients, and can cause soil degradation (Killebrew & Wilff, 2010). With modern agriculture methods like hydroponics, aeroponics, and aquaponics, it is now possible to substitute soil (and large land requirements) with nutrient-rich water systems. Because the newer systems do not require fertile land for production, they require less water and space, and operate much more efficiently (Marginson, 2010). In addition to the higher yields per unit area and the water efficiency, modern systems are constructed ways to combat seasonal changes of the outside environment; thus, leading to continuous production throughout the year (Brechner & Both, 1996). Figure 2-6 displays the efficiencies (in percentages) of modern agriculture compared to conventional agriculture.

Even tough modern systems outperform conventional methods in a number of areas of efficiency, it would be near impossible for modern systems to completely replace the massive volume outputs achieved by conventional agriculture. When urban farmers have a multitude of options when they’re beginning to choose their method of production and the next section will go into further detail on those options.

Some of the most difficult aspects of urban agriculture relates to space and fertile soil, so to different strategies have been created to maximize utility. The most simply form of urban agriculture is much like rural farming in that it can reside in backyards, parks and open fields but requires a conducive natural environment with nutrient-rich soil and water consumption. The downside of using this technique is that the farmer has less control over the natural environment and its effects.
Considered one of the most common strategies for urban farming involves the use of raised beds. Raised beds are similar to conventional farming in that the plants grow from soil, but they are contained in elevated boxes with typically imported, nutrient-rich soil and can be root-proofed for growth containment. The elevated boxes provide protection from pests and a level separation from the less nutritious, inanimate material below. Similar to this concept is the use of raised benches, potting containers, and milk crates. Containers and crates are typically reserved for smaller items such as herbs and spices but can be an effective strategy for creating modular production. The raised beds are better suited for larger quantities of fruits and vegetables. These are ideal for urban settings as the materials below are concrete or contaminated and can be applied in backyards, parks, on rooftops, and along sidewalks.

Where permittable and when the economics make sense, greenhouses have been implemented as another strategy for creating conducive environments for farmers within urban settings. Though initial costs may be pricey, they do allow for year-round production which extend profits. Engineered greenhouse structures usually include all the features required for production such as fans, heaters, thermostats, etc. As an alternative, suppliers also offer more affordable options such as high tunnels or hoop houses. High tunnels and hoop houses perform are essentially the same thing as greenhouses but without the features of fans, heaters, and temperature control. They operate is a more natural way of containing heat. Table 2-3 indicates prices one may expect for the structures.

Another affordable option for expanding the growing season, builds upon the construction of raised beds. Cold frame extensions act as “mini-greenhouse” that fit on top of raised beds, like a lid. “During the winter months, cold frames trap heat from the sun to maintain an environment that is up to 30 degrees warmer that outside” (Green City Growers, n.d.). These
alternatives are more affordable than purchasing entire greenhouses and are simple solutions for city ordinances that prohibit greenhouses.

The watering of these plants using these methods may include natural rain, surface irrigation, or drip irrigation. For larger scale production on places such as rooftops, drip-irrigation is popular and significantly more efficient. “Drip irrigation uses 30-50% less water than surface irrigation, reduces, salination and waterlogging, and achieves up to 95% irrigation efficiency” (World Bank, 2006). Spray systems are also effective delivery systems that are much more efficient than surface irrigation and typically implemented in aeroponics systems.

In an effort to fully maximize limited space, urban farmers have also turned entire rooftops into gardens. To be able to plant directly on top of the rooftop, there need to be some structural assurances. Aside from standard roofing construction that includes decking, insulation, and waterproofing; rooftop gardens require additional elements such a root barrier, drainage layer, filter layer, and the medium (Green City Growers, n.d.). Figure 2-7 provides a cross-section visual for rooftop garden system.

The benefits of rooftop gardens include urban heat-island reduction, storm water runoff prevention, nitrogen fixation, pest control, and energy conservation (Arizona State University, 2018). They maximize available space are can be found on top of residences, parking garages, and commercial, industrial, and institutional buildings. Rooftop garden is most ideal for the largest productions and typically serve beyond household- or structure-only use.

When horizontal farming space becomes limited, there is an option for urban farmers to turn to vertical farming. The farming is either done in secured vertical columns, plastic piping along the side of a wall, or hung within sacs or buckets. Vertical farming integrates both
hydroponic and aeroponic methods but can also utilize conventional, soil methods with or without drip irrigation.

Finally, there is also potential for urban farmers to utilize aquaponics. Aquaponics, as a combination of aquaculture (raising aquatic animals in tanks) and hydroponics (cultivating plants in water), requires a recirculating aquaculture system with a number of filtration systems to maintain the balance between fish and soilless plants. Fish are harvested in large tanks and their waste is circulated out and used as nutrient for plants. The plants then filter the absorb and filter the waste and allow for the waste water to be circulated back into the fish tanks. Depending on the size of the operation, initial investment costs may range from a few thousand dollars to several thousand dollars (Purdue University, 2011). Though aquaponics can be profitable, they require relatively high investments in tanks, recirculating pumps, filtration systems, and energy costs/temperature control.

**Crops**

While urban agriculture cannot match the massive output levels of rural, conventional farming, it can expect higher yields per unit with reasonable market return. The most common type of crop produced by urban farmers are fresh produce like fruit, berries, vegetables, and salad greens. “Fresh produce is less regulated and easier to package and transport than other food products such as meat and eggs” (Dorward, Schutzbank, & Mullinix, 2013, p. 18).

The Institute for Sustainable Horticulture at Kwantlen Polytechnic University (Vancouver) conducted a study to determine the profitability potential of small-scale, urban farms in the Vancouver metropolitan area. To increase confidence in the study and consider inherent uncertainty of farming, the study increased farming costs by 15% and decreased yields by 10%. Costs include both fixed and variable cost required for complete production. The manager’s/owner’s salary is assumed to be paid out of the farm’s net revenue.
In scenario 1, the one-acre farm produces 29 crops and 3 animals (bees, chicken, and lamb) and generates $24,405 profit. Scenario 1 is able requires 0.41 labors and has their salary built into the cost calculation. This means the manager/owner of the of the farm would have a year-end salary of $24,405. In scenario 2, the one-acre farm only produces the “10 most valuable crops/animal products”. and in this scenario, profits nearly double. If the urban farm manager/owner were to only focus on these ten products, year-end net profit was estimated to be $45,647.

The importance of this study and this section is to emphasize how critical crop selection may be. In both scenarios, each farm required about half of a full-time employee and incurred the production costs, but the year-end profits significantly differed based on crop selection. Urban farmers need to be aware of the market potential, high profit margin crops, and planting cycles of different crops to maximizes their profits. This type of small lot (acre or less) farming technique is called SPIN (small plot intensive)-farming. “By prioritizing high value crops, urban and near-urban farmers can greatly increase the profitability of their business” (Dorward, Schutzbank, & Mullinix, 2013, p. 43)

Key Challenges, Considerations, and Complaints

The following section will address key challenges, external considerations concerning local government and the community, and internal considerations that will possibly affect the startup and success of urban agriculture within cities. Key challenges have been considered vital to the existence of operations and considerations are to be thought of as variables that would alter the path operations throughout the lifetime of the venture.

Key challenges

There are three key challenges cited throughout the literature concerning urban agriculture: access to land, access to water, and access to capital. With modern agriculture
methods, urban farming can happen almost anywhere. They’ve been created in residential areas, commercial and industrial zones, parking lots, contaminated sites, vacant lots, rooftops, and more. The land uses for these areas can include both agriculturally zoned and non-agriculturally zoned but accessing this land has been cited as a major hurdle for urban agriculture ventures (Armstong, 2000; Campbell & Salus, 2003; Kaufman & Bailkey, 2001; Hagey, Rice, & Flournoy, 2012).

While land access has been considered a key challenge, “many US cities have a substantial acreage in vacant lots” (Golden, 2013, p. 16) that are unproductive and even counterproductive to economic and community growth. Some locations in North America, like Portland, Vancouver, and Michigan have made concerted efforts to utilize these vacant lands for agriculture (Balmer, et al., 2005; Balmer, Mendes, Kaethler, & Rhoads, 2008; Colasanti, Litjens, & Hamm, 2010). The reason why land access has been one of the greatest challenges for urban farmers has been due to elevated land prices, lack of suitable space, potential ban on farming activates, lack of formal leasing structure, or high costs for remediating contaminated sites (Dorward, Schutzbank, & Mullinix, 2013). Where it is possible to farm, it is crucial for urban farmers to secure agreements with landowners, developers, and local government to produce. In return, these agreements typically charge a lease or rent of the space, a percentage of sales or output, or obligate some engagement with the community.

Even though one of the most the significant benefits of modern agriculture is its very high-water efficiency, access to water sources remains a key challenge for farmers. Aside from the small percentage farms that solely depend on rainfall, many urban farms utilize some sort of irrigation system requiring water access. Sources of water, like well water and metered water, can be limited or very expensive. The use of potable water for irrigation may create strains on
local resources and create added costs for the general tax base. There also may be locations where water access has become increasingly challenging when municipalities must resort to water restrictions. In some areas, water access may simply not be available (Golden, 2013; Dorward, Schutzbanks, & Mullinix, 2013).

Like any startup or small business, access to capital can also be considered another key challenge for urban farmers. Unfortunately, urban farmers using modern agriculture methods require large amounts of upfront investment for setup and equipment. Some of this capital may be accessed through both federal and state agencies targeting pilot projects, incentives for community development, or supporting regional food networks but may be competitive, limited, or both. Since many urban farming ventures include a social element meant to benefit low-income communities, “race and class-based disparities of farmers and gardeners…are difficult to access” (Golden, 2013, p. 15). For these reasons, access to capital has been considered the third key challenge for urban farmers.

Access to land, water, and capital have been identified as the most commonly cited key challenges for urban agriculture projects. Though there are substantial amounts of vacant land in cities across America, access to these has been overwhelmingly denied for the prospect of more advantageous ventures with potential higher tax rates. In addition, it is possible that many cities perceive that agriculture does not fit within the dynamic city functions. Access to water is also a key challenge in that it may be very expensive or not readily available. Aside from smaller urban agriculture operations, access to capital for upfront development has also been identified as a key challenge.

Considerations

This section will look into other considerations urban farmers should account for when attempting to initiate an urban farming project. Some considerations involve the interaction with
both internal and external factors. The actors involved in the development include government officials, local institutions, organizations and businesses, community members, and people of the like. The actors are important considerations as they will all have their own opinion and reasons for backing or denying the advancement of such projects. In many cases, there will be instances where it is necessary to interact and work together on certain topics.

Possibly the most important consideration (outside of the key challenges) relates to the state and municipal legislation for urban agriculture. It is most common for each state and municipality to generate their own comprehensive plans designed to guide future community growth and actions (University of Illinois, n.d.). These comprehensive plans establish long-term goals and objectives as well as how proportions of their land will be utilized. In support of this master document, municipalities will also establish and enforce policies, zoning, and ordinances to control legal activities and growth. Communities and neighborhoods may even establish their own set of policies to be enforced on top of the municipality and state ones. These documents allow communities to function in an orderly manner, ideally. But it is important to realize how these documents effect urban agriculture, some may be more conducive or restrictive for such an environment.

There are additional considerations within and around the community that should also be accounted for. Some urban agriculture decisions may be dependent on the approval or consensus from other community members. The lack of community support for such ventures are very much a realistic barrier for urban farmers. Additionally, the culture around supporting local food production has frequently been linked to more affluent communities (Bradley & Galt, 2013; McClintock, 2013) and as so, many urban agriculture programs have been proposed from this perspective (Golden, 2013). This act often disrupts the social equity by alienating the low-
income target audience because of mobility and affordability (Macias, 2008; Metcalf & Widener, 2011). The more successful urban agriculture projects tend to be community-led as they more knowledgeable and aware of neighborhood's needs (Bradley & Galt, 2013; White, 2010).

Finally, other considerations for urban agriculture should consider internal factors such as operational activities (i.e. food production, processing, marketing), market orientation, target audience, product choice, product inputs, technology, and scale of production. Different locations around the US are more conducive for certain type of foods and are in different levels of demand. It is reasonable to assume that for-profit organizations will be treated differently (funding- and policy-wise) by local governments than non-profits would. As mentioned before when considering crop production, one-acre lots may decide to the SPIN method and only target high-profit, high margin crops. Larger lots may have the flexibility to include a wider variety or higher volume strategy. The ability to obtain affordable structures, equipment and technology can also become a deciding factor.

There are many considerations that an urban agriculture project would need to consider including the external factors such as actors involved, legislation, and community support. Though it’s not unreasonable to believe that these external factors can be positively influenced, they may be beyond the resources of many small-scale urban farmers. Internal factors such as farming operations and practices have also been cited as important considerations and the next section will go into further detail on how these can be managed.

Complaints

Contaminated brownfield sites must already combat health and productivity concerns; however, this is amplified when proposals are to include the production of food. Empirical literature points the contamination, not farming within an urban setting, as the driving force behind the stigma and complaints of growing food in urban brownfields. The EPA and sixty
experts from academia, local government, and the non-profit sector met in 2010 to discuss a variety of issues related to growing healthy food on contaminated sites. One result of this meeting identified that “the cleanup standards in existence are designed to protect people on the site from ingestion and inhalation of contaminants in the soil, water and air, but do not address the consumption of food grown on the site” (US EPA, 2015). However, the American Planning Association (APA) has cited that there are some requirements for soil testing at the local level of government and in some cases, these tests are being driven by community organizations. This potential policy gap has left the door open to criticism for implementing urban agriculture on contaminated sites and solely target the farms’ ability to ensure food quality.

Best Practices

An Urban Farming Guidebook was published in 2013 by EcoDesign Resource Society in British Columbia to “support local governments and communities in finding innovative and creative strategies for sustainability and resiliency” (Dorward, Schutzbank, & Mullinix, 2013, p. III). The guidebook was also published with the support from agricultural planning practice, HB Lanarc-Golder. This section will summarize core characteristics for urban farm practices that the group has identified (Dorward, Schutzbank, & Mullinix, 2013).

Farming practices: The use of SPIN (small lot intensive) farming and permaculture are techniques most commonly used in urban farming to result in high yields for small spaces. Other innovative techniques include hydroponics, aeroponics, and aquaponics which eliminate the need for soil and operate with much higher efficiencies. Though the urban agriculture movements typically support organic growing, not all farms use operate this way, but some municipalities are limiting or prohibiting the use of certain chemicals and pesticides.

Crops: Fresh produce crops are the most common type of crops grown on urban farms. They typically include fruits and vegetables most conducive given each environment and
climate. Compared to meat and eggs, fresh produce is much easier to handle and less regulated, resulting in less barriers between producer and consumer. Livestock is least common due to policies, required space, and potential nuisance.

Mediums: Most urban farmers utilize the use of soil and prefer organic methods of production. Due to space restrictions and regulations, the use of compost as nutrient has been a significant challenge for farmers. Soil contamination within urban areas are common and require soil testing and remediation when needed. The use of modern agriculture techniques is a common strategy for addressing the nuisance of soil and compost use.

Water: Access to water is one of the key challenges for urban farmers and vital to operations. Sources of water may include piped water, well water, or treated storm water. Efficient use of water is critical as water can be expensive or limited.

Structures: Urban farmers may utilize farming structures where permitted and typically include greenhouse, storage tanks or sheds, raised beds, root cellars, food handling kitchens, or classrooms.

Value-added processing: There is a medium to high risk when dealing with processing of fruits and vegetables such as canned fruit, jams, and pickled vegetables due to local regulations. There are opportunities for urban farmers to partner with local organizations that operate as food processors. The processing of food can help decrease food waste that cannot be sold and provide a wider variety of local food products.

The best practices for urban farming should always consider the environment and conditions around the project. Political, economic, social, and physical environments greatly affect urban farming’s implementation and overall success. An urban farms’ practices, crops, methods, and resources must be appropriately curtailed to the environment in which it exists.
Much of the decision-making for each of these factors will be highly dependent local policy, zoning, and ordinances. The next section will cover the importance of local governments and conducive policies for urban agriculture.

**Policy and Planning**

As the urban agriculture momentum continues to gain traction, many state and local governments are emphasizing plans to strengthen their food systems (Dorward, Schutzbank, & Mullinix, 2013). They are recognizing the relationships between comprehensive planning, community development, urban revitalization, health, food policy, and sustainability. “Local and regional governments play important roles in legitimizing urban agriculture as a recognized land use or community development strategy” (APA, n.d.). Governments are working to provide supportive legislation and conducive environments that offer access to land, capital and markets that are the necessities for profitable urban farming (ATTRA, n.d.).

- The Chicago Metropolitan Agency for Planning (CMAP) made it “one of the priority recommendations of GO TO 2040, the region’s comprehensive plan, is to promote sustainable local food” (CMAP, 2012, p. 7) and targets three focus areas:
  a) Production of food in the region, and  
  b) Access to affordable, nutritious, fresh food  
  c) Raised awareness and improving available data and research  

- In addition, the City of Chicago has creating two major platform strategies, “A recipe for Healthy Places” and “Green Healthy Neighborhoods”, that support healthy community-based planning strategies and urban agriculture (City of Chicago, 2013; City of Chicago, 2018).

- The Delaware Valley Regional Planning Commission (DVRPC) created a plan “aimed at increasing the security and economic, social, and environmental benefits of regional food system that feeds Greater Philadelphia” (DVRPC, 2011, p. 1)

- The city of Orlando launched a Community Action Plan that included “Local Food Systems” as one of its primary focus areas (City of Orlando, 2013):
The American Planning Association (APA) suggests that the community engagement process is the ideal starting point for urban agriculture. Governments and its planners need to identify how urban agriculture can contribute to the goals and growth of the its communities. Governments should then assess and inventory local resources that could support or deter urban agriculture and finally, evaluate its current policies and legislation (APA, n.d.). These are the first steps local governments can take to more successfully incorporate urban agriculture into their decision- and plan-making process.

Urban agriculture usually relates to the achievement of larger social and environmental goals. Open space goals and policies surrounding vacant land conversions, environmental preservation, and improved local food systems are commonalities among urban agriculture objectives. Subsidies and tax incentives have been identified as economic policies that encourage development in underserved or vacant locations. Housing goals and policies can support urban farming near low-income areas in ways such as community gardens, rooftop gardens, and community kitchens. Community health goals and policies could help support access to higher quality food options, food education, and food literacy (APA, n.d.).

- The City of Chicago, IL established policies within their Livable Communities section of their Comprehensive Plans to “increase water efficiency” and “improve health and availability of local food” (CMAP, 2014, p. 27) and more specifically “facilitate local food production”, “increase access to healthy food”, and “raise understanding and awareness” (CMAP, 2014, pp. 48-49)

- The City of Philadelphia, PA established a policy within their Neighborhood Centers section of their Comprehensive Plans to “provide convenient access to healthy foods for all residents” (City of Philadelphia, 2011, p. 71).

- The City of Lynchburg, VA established a policy within their Education and Community Health section of their Comprehensive Plans to “improve access to healthy foods at the Lynchburg Community Market and center programs” (City of Lynchburg, 2014, p. 29).

- Alachua County, FL established various policies that committed to supporting agriculture activities within urban clusters. The county included the elements in both their Future
Future Land Use Element

i) Policy 6.1.4 The County shall support the development of markets and programs that promote the sale of locally produced agricultural goods, including but not limited to farmers markets, community gardens, farm to institution programs, and agritourism opportunities. The County shall partner with local community groups and organizations and other local governments to pursue funding sources for the development of a sustainable local food system.

ii) Policy 6.1.5 Agricultural pursuits shall be allowed in all land use classifications, provided that the health, safety and welfare of the general public and the protection of the natural environment are assured. The land development regulations shall include standards for agricultural pursuits and related uses in the Urban Cluster, including but not limited to farmers markets, community gardens, laying hens, and other small-scale agricultural uses as allowable uses in appropriate areas.

b) Economic Element Economic

i) Policy 1.1.2 Promotion of economic development efforts that build on and complement existing commercial, industrial and agricultural assets in the local economic system.

ii) Policy 1.1.6 (c) Highlight local specialty foods and farmers markets as part of the County’s tourism market.

Beyond comprehensive planning and policies, zoning has also been a commonly cited barrier for urban agriculture. An increasing number of local governments are reviewing their zoning standards to now incorporate urban farming as acceptable uses within existing zones. Other governments have formed entirely new zones specific for urban agriculture while others have included it as a desired feature for newly planned developments. Other policies authorize specific activities to support of urban agriculture such as the strengthen of networks and infrastructure (APA, n.d.).

Furthermore, local governments also use ordinances to help regulate the intensity of urban agriculture. They will commonly create distinctions concerning gardens such as whether or not the product is for personal consumption or for market sale, the size of the garden, or
permissible activities within the garden, or acceptable structures. “Use standards may address elements such as setbacks, hours of operation, storage, accessory structures, odor and noise, fencing, lighting, composting, and whether animals on-site of produce are permitted” (APA, n.d.).

- In the City of Chicago, the Zoning Ordinance Administration, has approved a new zoning code provision that would “promote the expansion of community gardening and urban farming within city limits” (City of Chicago, 2011). The provisions:
  a) Expanded the allowable size limit to 25,000 square feet
  b) Relaxed fencing and parking requirements to hold down overhead costs
  c) Allowed for hydroponic and aquaponic systems and keeping honey bees under set conditions
  d) Created green jobs and provided fresh produce in communities

- In the City of Philadelphia, the Zoning Code Commission established “urban agriculture” as a its own, standalone use category subject to specific standards.
  a) The urban agriculture use category “includes uses such as gardens, farms, and orchards that involve the raising and harvesting of food and non-food crops and the raising of farm animals” (Philadelphia Zoning Code Commission, 2011, pp. 6-17).
  b) Standards included where sales were permitted, required designation, contained drainage to property, barrier fencing or dense vegetation, rodent-resistant compost bins, enclosed storage, and work curfew (Philadelphia Zoning Code Commission, 2011, pp. 6-36)

- The City of Fort Lauderdale amended their Unified Land Development Regulations finding that an “urban agriculture ordinance will restore agricultural business to the local economy and bring fresh produce to those areas where the population may not have the means to obtain fresh produce” (City of Fort Lauderdale, 2012, p. 2). The ordinance established:
  a) Urban farms to be permitted as primary or accessory use within many land use designations including parks, open space, commercial, industrial, mixed-use residential, office parks, utilities, and more.
  b) Conditional uses of community gardens in parks, open spaces, commercial recreation, community facilities, and electrical generation.
  c) The applicant process inquiries about the proposed types of crops, hours of operations, equipment, persons involved, chemicals and fertilizers to be used, water sources, plans for runoff, composting, storage, and more.
d) Standards included square footage, use of sheds, equipment, parking and signage

Many cities and states across America have recognized the importance of local food systems and have made it official by emphasizing local food systems within their comprehensive plans, policies, and zoning. The empirical literature has indicated that local governments have focused on analyzing the location of food deserts and obesity rates within their communities as key indicators. From this, local governments have moved forward with targeting three focus areas: food production, access to healthy foods, and overall nutrition awareness and education. In addition to the creation of overarching goals and policies related to local food systems, local governments have given more permissible use of urban agriculture within the city limits and various zoning categories. The process of legislation reform has given further creditability to the importance and sustainability of urban agriculture within our communities.

Funding

Startup expenses for urban agriculture ventures will greatly vary by location because of a number of different factors (like land and utilities) that are site-specific. The United States Department of Agriculture (USDA) has broken these expenses four major categories (USDA, 2016):

- Location – land acquisition, permits, environmental assessment
- Site Preparation – site modifications, soil, fencing, signage, ensuring sufficient access to water
- Structures – production, storage, protection
- Growing and Selling – expenses associated with the first year of operation such as tools, growing supplies, utilities, advertising, web design as well as administrative and operating cost that will be reoccurring

Funding can come from a number public and private sources. The federal government provides urban agriculture funding from the USDA and HUD. The EPA may also provide
federal funding if the site is contaminated and requires remediation. Both states and local municipalities also provide government funding for urban agriculture but vary from each other given their differing regulations and environments. These funds are managed by state and municipal departments or sometimes funneled through non-profit organizations, like the Urban Farming Institute of Florida. The funds can be utilized by a variety of organizations in within both the public and private sectors and typically focus on the following key focus areas (USDA, 2016):

- Business Planning and Risk Management
- Land Access
- Soil Testing
- Water Access/Use
- Capital and Financing
- Infrastructure
- Market Development
- Training and Mentoring

Table 2-4 indicates an assortment of federal funding programs and grants available for urban farmers and organizations. All programs and services are provided by the USDA unless indicated otherwise. Federal service organizations solely provide information and assistance, funding will come from the program organizations. Some programs and services will overlap and be listed in multiple key focus areas.

There are a number of additional grants and programs funded through HUD, such as Section 108 Loan Guarantees, Empowerment and Enterprise Zones, the Small Business Association’s (SBA) 504 Loan Program, historic rehabilitation tax credits, and the Economic Development Administration’s (EDA) Title IX Program that can also support urban agriculture funding. The potential for the benefits of urban agriculture to improve community development make these funding sources obtainable for urban farmers and organizations. The USDA’s National Institute of Food and Agriculture have a search engine for funding opportunities.
An agriculture-rich state like Florida receives substantial amounts of federal funding given their output capacity and resources available. For instance, in 2017, the Florida Department of Agriculture and Consumer Services was awarded approximately $3.8 million in federal funding from the Specialty Crop Block Grant Program. This $3.8 million accounted for roughly 15% of the $60 million fund. Florida’s award was double the amount rewarded to states like Michigan, New York, Oregon, and Texas; comparable to Washington state and five times smaller than California.

In addition to these federal funds, the state of Florida has created their own state-led programs and funds through their Florida Department of Agriculture and Consumer Services (FDACS). Some of these programs receive funding from the federal government or private entities then are administered and managed by the state or delegated to non-profit organizations. The list of FDACS grant opportunities focus in areas such as healthy schools and food services, nutrition and agriculture education, physical activity and wellness, aquaculture efficiency improvements, and urban and community forestry (FDACS, 2018).

Many local governments, foundations, and businesses have acknowledged the significance of local food systems and urban agriculture. Both local governments and private entities advocating for support, but they are also creating legislation and funding for the cause. Through a variety of avenues, these organizations have made a significant amount of “funding available to support organizations dedicated to sustainable local production” (Dorward, Schutzbank, & Mullinix, 2013, p. 39). In places where there is no specific funding designated for local food systems or urban agriculture ventures (aside from federal funding), there is typically funding or incentives for depressed or at-risk areas.

- The State of California passed AB 115 (2013) that allows a county or city to establish Urban Agriculture Incentive Zones for the purpose of support local food production.
Landowners who reach agreements with the county or city can then have their lands assessed at a lower rate based on average per-acre value of irrigated cropland in California (State of California, 2017)

- The State of Washington passed HB 1115 (2015) that appropriated $307,000 solely for the Rainer Beach Urban Farm and Wetlands (State of Washinton, 2017). The farm is Seattle’s largest urban farm with community members who have access to educational activities, food production practices, wetland restoration, nutrition.

- The City of Chicago has designated two areas “Enterprise Zones” which are “depressed areas” within the City and “Qualified Investment Areas” which are low-moderate income areas with a concentration of disadvantage (City of Chicago, 2018).
  
  a) Qualified Enterprise Zones receive city tax breaks, and special exemptions to city ordinances and regulations upon approval
  
  b) Qualified Investment Areas receive financial support through the “Neighborhoods Opportunity Fund” which help with costs associated to land acquisition, rehabilitation, demolition, planning and design, recruiting and hiring, business incubation, mentoring, and training.

- The City of Gainesville, FL provides local business incentives such as a 50% discount on various development fees located on properties within their designated “Enterprise Zones” (City of Gainesville, 2018).

Because communities and organizations are recognizing the importance of sustainable healthy food systems within urban areas, funding for urban agriculture and local food systems have become more available than ever. Funding and incentives have been offered from multiple sources ranging from the federal, state, and local governments to private for-profit and non-profits organizations. Though this has been a step forward in the acceptance, support, and progression of urban agriculture within communities, there still remain many urban areas that do not specifically support this exact type of venture. Alternatively, these local governments and organizations financially support more generalized local ventures that target depressed areas, such as Enterprise Zones. In either case, there a multiple opportunity for financial support as urban agriculture seems to have malleable qualifications within social, economic, and community development.
Summary of Literature

The presence of brownfield sites located within cities can be detrimental to a communities’ economic, social, and environmental development. “Such dormant, underutilized properties have led to environmental and human health problems but also contributed to the problem of urban decay” (Pippin, 2009, p. 596). Any such redevelopment actions should capitalize on the opportunity to revitalize the surrounding community and environment, not just the site itself. Therefore, it is important to consider development options that are not only economic beneficial for developers but socially and environmentally beneficial to the community. There are a number of actors involved brownfield redevelopment projects and they all play a significant role in the planning process. The success of brownfield redevelopment projects relies on the shared collaboration among local municipalities, land owners and developers, community organizations, and residents.

Integrating urban agriculture strategies has the potential to deeply impact community revitalization while addressing urban challenges such as urban decay, unemployment, household income, food deserts, access to healthy foods, and storm water runoff. There are a variety of modern farming systems that can be implemented in urban settings when environmental conditions are not ideal for food production. Conducive local legislation can also influence and allow the urban communities to reap the benefits of urban agriculture. In addition, there are many funding opportunities for urban agriculture at the federal, state, and municipal levels of government. The following chapter details the methodology used to develop the tools and strategies from the three brownfield redevelopment projects that featured urban agriculture as their development solution.


<table>
<thead>
<tr>
<th>Parameters</th>
<th>Hydroponic system</th>
<th></th>
<th>Aeroponics</th>
<th>Aquaponics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Media</td>
<td>Soiless system</td>
<td>Nutrient solution system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Open</td>
<td>Closed</td>
<td>Open</td>
<td>Closed</td>
</tr>
<tr>
<td>% Irrigation water saving</td>
<td>80</td>
<td>85</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>% Fertilizer saving</td>
<td>55</td>
<td>80</td>
<td>68</td>
<td>85</td>
</tr>
<tr>
<td>% Productivity increase</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td>% Water productivity</td>
<td>1000</td>
<td>1600</td>
<td>2000</td>
<td>3500</td>
</tr>
</tbody>
</table>

Table 2-1. Different land types within urban settings with a brief description and potential landowners.

<table>
<thead>
<tr>
<th>Land Type</th>
<th>Description</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Use of one or more residential lots. Space is often leased in exchange for food or percentage of sales</td>
<td>Homeowner</td>
</tr>
<tr>
<td>Parking Lots / Rooftops</td>
<td>Privately owned land. Farms are typically temporary and utilize raised beds.</td>
<td>Developer / Business</td>
</tr>
<tr>
<td>Parks / Public Space</td>
<td>Approved by government to transform a portion into an urban farm or community garden</td>
<td>Local Government</td>
</tr>
<tr>
<td>Institutional</td>
<td>Farms on hospital, universities, or other institutions</td>
<td>Institution</td>
</tr>
<tr>
<td>Vacant</td>
<td>Vacant or underutilized due to land holding or soil remediation. Typical of commercial and industrial areas, with use of raised beds.</td>
<td>Developer, Business, or Municipality</td>
</tr>
<tr>
<td>Agricultural</td>
<td>Land zoned for agricultural use within city limits</td>
<td>Varies</td>
</tr>
</tbody>
</table>

Table 2-2. Different type of agricultural methods, corresponding mediums, and brief description of each process.

<table>
<thead>
<tr>
<th>Agriculture Method</th>
<th>Medium</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>Soil</td>
<td>Plants require soil, large quantities of water and fertilizer, medium yield per unit area, highest yield quantity</td>
</tr>
<tr>
<td>Hydroponics</td>
<td>Various; mineral wool, clay aggregate, fiber, rockwool, sand, gravel, etc.</td>
<td>Plants are grown within various mediums with nutrient-rich solutions. Drip irrigation is common. Better stability, high yield per unit area, high efficiency of nutrient and water.</td>
</tr>
<tr>
<td>Aeroponics</td>
<td>None</td>
<td>Plants are suspended in a dark enclosure, while a nutrient rich solution is sprayed on the roots. Better stability, highest yield per unit area, highest efficiency of nutrient and water.</td>
</tr>
<tr>
<td>Aquaponics</td>
<td>Nutrient-rich water</td>
<td>Relies on integrated relationship between animals and plants to maintain stable aquatic environment. Fish waste is an organic food source for plants and the plants act as natural filters for the water. Natural stability, high yield per unit area, high efficiency of nutrient, highest efficiency of water.</td>
</tr>
</tbody>
</table>
Table 2-3. Price comparison for agricultural structures based on size, total and per square foot.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Area (sq. ft.)</th>
<th>Total Price</th>
<th>Price per sq. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenhouse</td>
<td>2,988</td>
<td>$45,650.00</td>
<td>$15.28</td>
</tr>
<tr>
<td>High Tunnel</td>
<td>2,880</td>
<td>$9,078.00</td>
<td>$3.15</td>
</tr>
<tr>
<td>Greenhouse</td>
<td>1,152</td>
<td>$23,650.00</td>
<td>$20.53</td>
</tr>
<tr>
<td>High Tunnel</td>
<td>1,080</td>
<td>$4,445.00</td>
<td>$4.12</td>
</tr>
<tr>
<td>Greenhouse</td>
<td>648</td>
<td>$13,194.50</td>
<td>$20.36</td>
</tr>
<tr>
<td>High Tunnel</td>
<td>480</td>
<td>$3,050.00</td>
<td>$6.35</td>
</tr>
<tr>
<td>Hoop House</td>
<td>197.5</td>
<td>$999.00</td>
<td>$5.06</td>
</tr>
<tr>
<td>Greenhouse</td>
<td>136.5</td>
<td>$4,795.00</td>
<td>$35.13</td>
</tr>
</tbody>
</table>

Table 2-4. Government funding for urban agriculture based on focus area and eligibility.

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Federal Services and Funding</th>
<th>Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Planning /</td>
<td>Sustainable Agriculture Research and Education (SARE) Program</td>
<td>For-profit farms, cooperatives, non-profit and public corporations, economic development corporations, farmers market authorities, local government</td>
</tr>
<tr>
<td>Risk Management</td>
<td>Farmers Market Promotion Program (FMPP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Local Food Promotion Program (LFPP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Agricultural Marketing Service (AMS)</td>
<td></td>
</tr>
<tr>
<td>Land Access</td>
<td>USDA’s Farm Service Agency (FSA)</td>
<td>Agricultural producers</td>
</tr>
<tr>
<td>Soil Testing</td>
<td>Cooperative Extension Service</td>
<td>Agricultural producers, rural and urban public, non-profits, state and local governments, academics</td>
</tr>
<tr>
<td></td>
<td>EPA’s Brownfields Program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SARE Program</td>
<td></td>
</tr>
<tr>
<td>Water Access / Use</td>
<td>Natural Resources Conservation Service (NRCS)</td>
<td>Agricultural producers in both rural and urban areas</td>
</tr>
<tr>
<td>Capital and Financing</td>
<td>Farm Loan Program</td>
<td>Agricultural producers</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>SARE Program</td>
<td>Farmers, non-profits, for-profits, academics in both rural and urban areas, cooperations, economic development cooperations, local government</td>
</tr>
<tr>
<td></td>
<td>NRCS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Farm Storage Facility Loan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rural Energy for America Program (REAP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FMPP and LFPP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HUD’s Community Development Block Grant (CDBG)</td>
<td></td>
</tr>
<tr>
<td>Focus Area</td>
<td>Federal Services and Funding</td>
<td>Eligible</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Market Development  | FMPP and LFPP  
Specialty Crop Block Grant Program  
National Organic Certification Cost-Share Program  
Supplemental Nutrition Assistance Program (SNAP) at Farmer’s Markets  
WIC Farmers’ Market Nutrition Program (FMNP)  
Senior Farmers’ Market Nutrition Program (SFMNP)  
Value-Added Producer Grants | Farmers, non-profits, for-profits, academics in both rural and urban areas, cooperations, economic development cooperations, local government, state departments                                                                                   |
| Training and Mentoring | The beginning Farmer and Rancher Development Program  
FMPP and LFPP  
Specialty Crop Block Grant Program  
Refugee Agricultural Partnership Program (RAPP) | Collaborative network of public and private entities, non-profits, cooperative extension, colleges or universities, non-profits working with refugees                                                                                       |
CHAPTER 3
METHODOLOGY, RESEARCH DESIGN, AND CASE STUDY ANALYSIS

This thesis assesses and identifies the most appropriate strategies for implementing urban agriculture into the redevelopment of the Cabot Koppers brownfield site in Gainesville, Florida. Traditional redevelopment projects for brownfield sites include the construction of parks, apartment complexes, office parks and developments alike. Though these redevelopments are common and may be effective in providing new job opportunities and increased land values, they can also be seen as short-sided and uncomprehensive to the needs and wants of surrounding communities. This thesis aims to investigate alternative development strategies that may serve as primary or complementary solutions to the overall redevelopment. This chapter clarifies the methodology, research design, the case study selection, data collection, and case study findings.

Methodology and Research Design

A cross-case, comparative analysis of three case studies was conducted to investigate the strategies used for implementing urban agriculture into brownfield sites. This was done in order to propose recommendations for the study area in this thesis. The analysis relied on secondary information from various academic and industry literature, published community surveys, and government resources. This information was used in a retrospective-prospective manner as it accounts for past community-intense, redevelopment projects and proposes future development strategies, based on the case study findings, in the following chapters. The comparative case study methodology was employed to best approach the answering of these questions:

1. How have cities used legislative and implementation strategies for integrating urban agriculture into their blighted, depressed areas?

2. How can Cabot Koppers best integrate urban agriculture for positive economic, social, and health benefit?
Each case study has its own set of unique factors and motivators due their site-specific locations and socioeconomic environments. The collective case study analysis emphasizes the use of a “pattern-matching process” (Yin, 1981) which “allows for theory building and the establishment of a common explanation between cases” (McGehee, 2013, p. 53). A critical look at these commonalities has led the assessment and supported reasoning for outcomes and successes of each case study. These commonalities will then be the basis for implementation strategies for Cabot Koppers.

It was the intent to investigate a variety of subject areas within each case study including the existing environment and conditions, the comprehensive plans, local policy and zoning, methods and types of urban agriculture implemented, program involvement and sustainability, indicators and measurements for success, and funding. These subject areas have been identified within the literature review and have been listed in the Data Collection section of this chapter. A conclusion of these results along with outcomes and opinions will complete each case study analysis. The cross-case, collective analysis, titled “Assessment of UA (Urban Agriculture) Redevelopment Plans” was organized as the framework to carry out the evaluation of each case study (See Table A-1 in the Appendix). The case study analysis section within this chapter translates these findings. These three case study analyses provide insight for integrating urban agriculture into brownfield sites.

Case Study Selection

The three case studies that were examined in this thesis included: Windy City Harvest in North Lawndale, Illinois; Lynchburg Grows in Lynchburg, Virginia; and Liberty Lands in Philadelphia, Pennsylvania. These cases were chosen because all three are located in urban settings and were transformed from contaminated industrial sites into urban farm lands. They provide a variety of geographical locations, demographics, urban agriculture legislation, and
redevelopment goals. The key characteristics and indicators for comparison will be covered in the ensuing Data Collection section.

These three case studies have been analyzed with the intent of translating their experiences into successful planning strategies for the Cabot Koppers site. The need to redevelopment the Cabot Koppers site is important and imminent. Even though each redevelopment project must consider the site-specific and surrounding elements that contribute to the revitalization attempt, it is beneficial to also consider other strategies that have been implemented elsewhere. The Assessment of UA Redevelopment Plans table defines the structure for the cross-case analysis and the insight into integration strategies.

**Data Collection**

The data collected for this thesis comes from secondary sources such as academic journals, university libraries, government records, and government-generated GIS data. The key indicators, as defined by the literature and the Assessment of UA Redevelopment Plans table, serve as the as the fundamental aspects for the evaluation and recommendation. From these key indicators the investigator can get a comprehensive understanding of the socioeconomic and political elements of each case study. Through the literature review, there were a number of commonalities identified as key indicators or challenges for integrating urban agriculture. These key indicators have been organized into four categories listed and italicized below. Examples of expanded subcategories follow the italicized categories.

- **Local Overview:** including median household income, SNAP households, race, unemployment rate, health insurance rate, obesity rate, walk-to-work rate
- **Legislative Strategies:** including comprehensive plan goals, policy objectives, zoning ordinances, local funding available
- **Redevelopment Conditions:** including year, size, land type, previous land use, contamination, access to land, access to water, access to capital, organization/developer, business type, redevelopment goals
• **Redevelopment Operations:** including UA methods/types, size, crops, mediums, water use, structures, value-added processes, output, jobs, economics, funding

The local overview is to provide background information on the current state of the community. Each “community” is considered to be those elements within the census tract. Additionally, qualitative information will be used to reference the broader context but will not interfere with rates and measurements. The legislative strategies have been included to compare how committed and supportive local government have been to urban agriculture. The redevelopment conditions and operations represent each side of the redevelopment process. The reason for this was to segment the entire process of transforming contaminated industrial sites to urban agriculture operations so that recommendation strategies can be made based on site progress. As much of this data is qualitative, linkages between evaluation and recommendation have also been supported in this manner.

**Case Study Analysis**

**Case Study I: Windy City Harvest Lawndale Youth Farm, Chicago, Illinois**

**Local overview**

The Windy City Harvest Lawndale Youth Farm is located in the North Lawndale neighborhood on the westside of Chicago, Illinois. The tract is located along a main commercial corridor, US Route 66/Ogden Avenue that radiates from downtown Chicago. Though the neighborhood is not located in a food desert (USDA, 2017), considered both low-income and low-access, it is adjacent to three other census tracts which are (USDA, 2017). The neighborhood is characterized as diverse, low-income and highly dense. Over 91% of the roughly 1,200 people living within less than 0.1 square miles of land are people of color. The median household income is 43% ($25,694) of the Area Median Income (AMI) with approximately 43% of people living below the poverty line and have an unemployment rate of
18.7% (US Census Bureau, 2017). About 40% of all households utilize the Supplemental Nutrition Assistance Program (SNAP) and as much as 14.1% of the entire population is food insecure. The USDA reports that over 25.3% of the population is obese (USDA, 2017).

The neighborhood of North Lawndale does have severe low-income and employment issues, but it is alarming to see the obesity rate for a community not within a food desert. Community members do have access to food, so the challenge could conceivably be either, they don’t have affordable food options, they don’t have healthy food options, or they don’t have both.

**Legislative strategies**

The City of Chicago has been considered very progressive and proactive in addressing local food systems and urban agriculture. In their GO TO 2040: Chicago’s Comprehensive Plan, they have specifically emphasized an overarching goal to promote local sustainable foods within their Livable Communities section (CMAP, 2014). The City created specific tasks forces and platform strategies such as A Recipe for Healthy Places and Green Healthy Neighborhoods.

Chicago has been supportive or urban farming and most recently expanded their approval by establishing various policies within the comprehensive plan, such as (CMAP, 2014):

- Increase water efficiency
- Improve health and availability of local food
- Increase the amount of natural areas
- Increase energy efficiency and opportunities in the “green” economy
- Facilitate local food production
- Increase access to healthy food
- Raise understanding and awareness related to healthy foods and nutrition
In addition, in order to stay current with the progressive urban agriculture movement, the City went further to clarify the definitions of “community gardens” and “urban farms”, whereas community gardens are typically owned or managed by public entities or community-based organizations and products are grown for personal or charity use. Urban farms on the other hand can be for-profit or non-profit organizations with the intent to sell produced items and would require a business license (City of Chicago, 2011).

Within the City’s zoning code, community gardens are permissible in nearly all zones except manufacturing and planned developments. Conversely, urban farms are restricted from residential and some business zones and more commonly promoted on in commercial and industrial settings. In addition, the 2011 Zoning Code Amendment further detailed urban agriculture within the city and (City of Chicago, 2011):

- Expanded the allowable size limit to 25,000 square feet
- Relaxed fencing and parking costs to reduce overhead costs
- Allowed hydroponic and aquaponic systems and keeping of honey bees under some set conditions
- Allow the sale of fresh produce within communities

Finally, like many cities across America, the City of Chicago has established some incentive programs to spur investment and development. Some of the incentives are available to venture within predetermined areas like Enterprise Zones, Tax Increment Financing (TIF) Zones, Industrial Corridor Zones. In addition, there are opportunities for ventures outside of these zones, these areas must meet the requirements of Qualified Investment Areas. If the area show indications of “economic deprivation”, then they become eligible for funds predominantly created by “downtown area bonus” and can used for things such as land acquisition,
rehabilitation, demolition, planning and design, recruiting and hiring, business incubation, mentoring, and training (City of Chicago, 2018).

Redevelopment conditions

The Windy City Harvest Youth Farm was developed on a 0.25-acre plot of land located on a main transportation corridor, zoned for neighborhood commercial uses, and surrounded by residential uses (Figure 3-1). The site was once a dry-cleaning business that contaminated the land with cleaning chemicals and eventually became vacant unproductive land. The land was then taken over by the NeighborSpace organization which is an urban land trust. The land trust was instrumental in overcoming the three key challenges of access to land, water, and capital as they provided all three. Once the site was cleaned up and remediated, the land trust came to an agreement with the Chicago Botanic Garden non-profit organization to propose, develop, and manage this area as an urban farm under their Windy City Harvest Initiative. The initiative sets out to provide human development, education, and employment for low-income communities and do this through advancing social emotional learning and sustainable urban agriculture.

Redevelopment operations

The urban farm has approximately 2,000 square feet, or about 20% of the lot, across 27 raised beds for growing produce (Figure 3-2). Even through the site has been cleaned up and remediated, the raised beds create a barrier between the growing medium and the ground below. This an effective method for eliminating cross-contamination that may be left by trace amounts of chemicals and storm water runoff that is constantly being produced in urban settings. Raised beds also allow for nutrient-rich compost to be contained and utilized for maximum benefit. There is also one shed on site for storage of materials and trash. The produce is hydrated with the conventional method of surface watering. Though exact output was not available for this specific site, the Windy City Harvest Initiative did annually produce over 100,000 pounds of produce.
over 8 acres worth of urban farming in Chicago (Chicago Botanic Garden, 2016). In addition, with the help of Windy City Harvest, the Lawndale Youth Farm has been able to create and have access to multiple farm stands and farmers’ markets, both on- and off-site. The farm also provides fresh produce to local cafés and community centers within the community.

At the core of the farm’s operations is the youth involvement. The program is only offered to the youth and provides employment while emphasizing leadership development, healthy lifestyle education, community service, social entrepreneurship, and urban farming practices. The program hires 20 part-time youth workers and schedules 4- to 20-hour work weeks during and outside of the school year.

The funding for this program is supported by the Chicago Botanic Garden organization which possess over $252 million in assets and reported a $39.8 million operating revenue and $39 million operating expenses in 2017 (Chicago Botanic Garden, 2018). The actual breakdown of what grants the Chicago Botanic Garden proved to be very difficult. However, according to the organizations 2016 IRS Tax Filing, 59.6% of their taxable income was from grant funding (IRS, 2017). In total, the Garden owns and operates 385 acres throughout the area and has over 50,000 members, making it one of the largest memberships of any US garden (Chicago Botanic Garden, 2018). The Windy City Harvest Initiative and the Lawndale Youth Farm are fortunate to be a part of such a large organization with expansive resources.

Conclusion

The USDA has categorized food deserts as those within low-income and low-access areas, both of which Chicago has. Within their legislative authority, the City has emphasized the importance of utilizing urban agriculture as a method for creating sustainable local food systems. Systems that focus on local food production, access to healthy foods, and nutrition awareness.
The City’s evolution in land use and zoning have relaxed the barriers that previously hindered the community’s ability to farm within the city.

The NeighborSpace and Windy City Harvest organizations highlighted the importance of collaboration. Their combined efforts allowed them to overcome key challenges such as access to land, water, and capital. Furthermore, their knowledge and resources permitted them to employ the site-specific strategies to tackle contamination, storm water runoff, production, distribution, and employment. Though the Lawndale Youth Farm is not technically located in a food desert, the statistics imply a need for more farms like this. Ones that convert blighted, unproductive areas into those that provide affordable, healthy food options within the community.

Case Study II: Lynchburg Grows, Lynchburg, Virginia

Local overview

The Lynchburg Grows farm is located in Lynchburg, Virginia about 55 miles east of Roanoke and 110 miles west of Richmond, Virginia. The City of Lynchburg is home to about 81,000 residents (US Census Bureau, 2017) within the city and approximately 261,000 in the metropolitan area (Data USA, 2016). The farm is located on the fringe of what is considered midtown and surrounded by a mixture of residential and industrial zones. The census tract is also located within and surrounded by multiple food deserts; which is consistent with most of Lynchburg (USDA, 2017) with low-income and low-access to healthy food. Minorities account for roughly two-thirds of the 3,600 people within the 1.36 square mile tract. The median household income is 44% ($27,316) of the AMI with approximately 42% of people living below the poverty line and have an unemployment rate of 7.8%. About 32% of all households utilize SNAP (US Census Bureau, 2017) and over 16% of the tract population is food insecure. The USDA also reports that over 27% of the adult tract population is obese (USDA, 2017).
The community in Lynchburg faces a threefold challenge when it pertains to healthy food. First, they are hindered by low-income levels that make added stress on food expenditures. Second, the community lacks access to healthy food options. And thirdly, they have high levels of obesity which can be attributed to unhealthy food habits. The Lynchburg community suffers from holistic problems in their local food systems.

**Legislative strategies**

The City of Lynchburg has recently adopted their Comprehensive Plan 2013-2030 which indicates an acknowledgement to healthy living and foods. Their Plan contains an overarching goal to promote a culture of lifelong learning and healthy/active living within their Education and Community Health section. The City has also created the Live Healthy Lynchburg initiative to promote this goal. In addition, Lynchburg has created a supporting policy to improve access to healthy foods at the community market and center programs (City of Lynchburg, 2014).

Lynchburg does address urban farming with a recent zoning ordinance in 2016. The ordinance permits vegetable farming and crop production in all zones with the exception of one (of four) business districts and all three restricted industrial districts. Greenhouse production is permitted on the majority of zoning districts, but the sale of products grown is limited to roughly half of the business, industrial, and restricted industrial zones. Additionally, the sale of products grown on residential districts is not permitted (City of Lynchburg, 2016).

The City has also established incentive programs for redevelopment in certain physical locations within the city or sectors of business. The inclusion of Enterprise, Rehabilitation, and Industrial Park Zones for specific locations and Technology, Tourism, Arts and Culture for sector specific businesses. These zones qualify for a number of incentives such as direct funding, tax breaks, and exemptions from certain ordinances and regulations (Opportunity Lynchburg, n.d.).
Redevelopment conditions

Lynchburg Grows was developed on a 6.8-acre lot of land located along an industrial zoned corridor with rail transit to the east and varying levels of residential zoning from the northwest to southern areas (Figure 3-3). One of predevelopment conditions that was beneficial to the farm was that it already accommodated 9 greenhouses as a rose garden. Once the rose garden went out of business in 1999, it was found that the site was contaminated with lead paint. Several plans were proposed to convert the garden into housing but eventually were denied. The land owner refused the sale as he did not agree with the site’s proposed direction and destruction of the garden’s heritage.

A disabled, long-time farmer who had recently lost his farm partnered with local businessmen to propose an alternative plan that continued the farming tradition. The group’s offer was accepted and the birth of Lynchburg Grows, a non-profit organization, had commenced. The organization appealed to local schools, colleges, and the community for help with the cleanup and contamination removal. The cleanup took nearly 18 months, 700 people, and 6,000 hours of volunteer work to complete (Hardy, 2007).

The key challenge of access to land and capital was unique in this situation as the previous use was for this lot was urban farming. The previous owner had a special interest in preserving the land with the same values and traditions so access to the land was natural. In addition, urban farming with modern agriculture (i.e. greenhouses) can be very expensive but this lot already came equipped with the greenhouses and made it possible for Lynchburg Grows to avoid much of the upfront costs that would be associated with building new structures (Hardy, 2007). The access to water is unknown but the Development Operations section will further detail how the organization addresses challenges associated with water. Other considerations like legislation, property use, and community acceptance were also eased by the fact that previous
operations and uses did not change that much. However, going from roses to consumable produce would have required stricter standards and regulations. Furthermore, the organizations initiative to employ workers with unique difficulties and provide healthy food options and services in such a food desert strengthened its approval from the city and its community.

**Redevelopment operations**

The urban farm has 70,000 square feet, or about 25% of the lot, across 9 greenhouses for growing produce, herbs, and spreads (see Figure 3-4). The farm also has one building for administration, value-added processing, selling, and storage of their materials and products. The on-site contaminants have been removed but to create an added barrier and more efficient farming practices, Lynchburg Grows has installed raised beds within the greenhouses. The greenhouses provide protection from the outside elements, ideal growing conditions, and year-round production capabilities. The raised beds are filled with nutrient-rich compost soil which is provided by community members and city waste. In was estimated in 2007, that this collection of just city waste saves the City of Lynchburg $96,000 per year (Hardy, 2007). The farm also employs drip irrigation to minimize water consumption and costs. This modern method of agriculture ensures maximum water efficiency, reduced saturation, and an efficient delivery of water to produce. In 2017, the farm reported an annual production of 23,924 pounds of produce which translated to 59,810 servings of healthy foods (Lynchburg Grows, 2018).

Lynchburg Grows also provides a number of ways to distribute products. The farm has two programs for obtaining products, the “Veggie Box” and the “Veggie Van”. The Veggie Box is similar to most community supported agriculture programs where members can make weekly pickups at the farm for verity of different produce, herbs, and spreads. As a large percentage of neighborhoods in Lynchburg lack access to grocery stores and other fresh foods, the Veggie Van helps combat this by offering a transport service. In 2017, the Veggie Van made 356 stops within
the community and offered fresh foods at reduced prices and donated goods by other local businesses such as Panera Bread (Lynchburg Grows, 2018).

Another program offered by the farm is called “FreshRx”. This program partners with local doctors to identify patients with diet-related illnesses. The participating doctors will then prescribe a prescription which is fulfilled by Lynchburg Grows. As part of the program, the farm offers nutrition and cooking classes taught by a nutrition educator from the Virginia Cooperative Extension. The program allows community members to improve their physical health through education and practice.

One of the founding principles for Lynchburg Grows has been its commitment to those with physical and mental disabilities. The workers execute the lion’s share of the work ranging from farming, preparing, weighing, processing, packaging, and administration. The determination to create purposeful jobs has created an environment to build social-, leadership-, and technology-driven skills. The farm currently employs 8 part-time workers (Lynchburg Grow, 2018) which equated to about 2.5 full-time jobs.

Funding for this organization is supported by a variety of sources including volunteers, foundations and trusts, corporations and businesses, private support, partnerships, and earned income. According to Lynchburg Grow’s 2016 IRS Tax filing, the organization reported $254,464 in total revenue of which 50.3% of that was from grants and 42.5% of it was generated from their programs. Their revenue less expenses for 2016 equated to $26,852 (IRS, 2017). The farm’s earned income alone was able to cover about 60% of the farm’s total operating expenses. As a non-profit organization, any revenues above and beyond their expenses are allocated to reinvestment into their operations, which amounted to roughly $196,000 (Lynchburg Grows, 2018).
Conclusion

One of the City of Lynchburg’s most glaring problems is the presence of food deserts throughout the city. The community surrounding Lynchburg Grows has been no exception and issues boil down to access and affordability. Lynchburg does state an overarching goal to improve access to healthy food and has supported this through the allowance of food production in many zoning districts. However, in comparison to Chicago, the sale of these foods has been designated to certain areas of the city and restricted from majority of these zones. It can be argued that this results in the dependence of people either travelling to designated locations or having the knowledge and ability to produce for themselves. These type of zoning laws encourage local food production but miss the mark on providing accessibility and awareness, both which were key policies within Chicago.

Lynchburg Grows does exemplify the importance of partnerships and collaboration among community members and organizations. Key challenges such as access to land and capital were accomplished through a shared vision of redevelopment among the organization and previous land owner. Addressing the access to water and contamination aspects was made easier by the types of modern agriculture methods that were being employed. Collaborations with community organizations such the City of Lynchburg, local businesses and schools, doctors, the Virginia Cooperative Extension, and others made it possible to support the various programs such as the Veggie Van, FreshRx, and the compost collection. Lynchburg Grows tackles many local challenges such as local food production, access and education, employment, and city efficiency. With further promotion and legislative action, the City of Lynchburg could better work toward eliminating the food deserts that plague most of their community.
Case Study III: Liberty Lands, Philadelphia, Pennsylvania

Local overview

Liberty Lands is located in the Northern Liberties neighborhood of north Philadelphia. The census tract that the farm is within is predominantly surrounded by residential areas, a commercial corridor one block east, and the Delaware Expressway 4 blocks east of the location. The USDA does not categorize this tract to be a food desert as it is not considered to be low-income or low-access as of 2015. Interestingly, this tract was a low-access region in 2010 (USDA, 2017). The neighborhood can be characterized as highly sense, affluent, and white. Over 70% of the 3,923 people living within the 0.3 square miles of land are white. The median household is 106% ($85,765) of the AMI with approximately 4.1% of people living below the poverty line and have an unemployment rate of 1.5% (US Census Bureau, 2017). About 3% of all households utilize SNAP and about 30% of the population is obese (USDA, 2017).

Unlike the other neighborhood previously mentioned, North Liberties does not have issues with low-income or low-access but instead have the highest obesity rate. The high level of obesity could be attributed to many factors, some of which may include poor eating habits or lack of nutritional education. It is interesting to see these results when the majority of the population have the resources and access, are likely to possess high levels of educational attainment, and yet, do not disregard the importance of nutrition.

Legislative strategies

Within Philadelphia’s 2035 Citywide Vision Comprehensive Plan, they have specifically emphasized the promotion of strong and well-balanced neighborhood centers within their Neighborhoods section. They have also supported this effort with a number of citywide tasks forces and initiatives such as the Delaware Valley Regional Planning Commission’s (DVRPV) Healthy Communities, Get Healthy Philly, and the Philly Food Bucks Program. The
comprehensive plan establishes a variety of policies that work in complementary ways to promote convenient access to healthy foods by (City of Philadelphia, 2011):

- Maximizing multimodal access to fresh food by encouraging food sales and distribution near key transit nodes through increased coordination, identifying opportunity, and prioritization
- Support agriculture and food distribution programs at recreation centers, schools, and other public facilities located in key neighborhood centers
- Establish farmers’ markets along commercial corridors within neighborhood centers
- Increase local food production through zoning designations that permit urban agriculture as-of-right in strategic locations and allow for rooftop gardens
- Development standards and guidelines for community gardens and urban agriculture

In the City’s updating of the zoning code in 2011, they further detailed the definitions of community gardens and urban farming. The difference between community gardens and urban farms is similar to the definitions mentioned in the Lawndale case study. Simply, community gardens are grown for individual consumption and managed by neighborhood associations or other non-profits. Urban farms are those in which produce product for the primarily purpose of selling the goods. They may be run by non-profit or for-profit organizations. The following zoning adjustment were also implemented, stating that fresh food markets are (Philadelphia Zoning Code Comission, 2011):

- Allowed to exceed 50% of lot area in zones where area limits are enforced
- Allowed to be a maximum of 25,000 square feet
- Allowed to exceed building height restrictions by 15ft
- Exempt from parking requirements for the first 10,000 square feet

Additionally, the commission established urban agriculture as its own, standalone use category and (Philadelphia Zoning Code Comission, 2011):
Permitted to sell goods on the same lot as the urban agriculture use in locations where retail stores are allowed

Must designed to control drainage and runoff

Must have a barrier fencing or dense vegetation along the perimeter of the garden

Must have rodent-resistant compost bins

Must have enclosed storage

No outdoor work activity that involves equipment or generators may occur between sunset and sunrise

Finally, like the other cities previously mentioned, the City of Philadelphia has established incentive programs to kickstart investment and redevelopment efforts. These incentives include Empowerment Zones, Revitalizing Corridors, and the Community Development Corporation Support. These incentives include grants and funding, reimbursements, tax credits, tax preparations, and financial literacy education. In addition, to generate funding for the Empowerment Zones, the city has created a Neighborhood Funding Stream which is a community endowment which annually invests 5% of the fund (currently $27 million) toward economic development within these zones (City of Philadelphia, 2018).

**Redevelopment conditions**

Liberty Lands was developed on a 2.04-acre parcel surrounded by residential neighborhoods, adjacent to a community commercial corridor (Figure 3-5). The parcel has been zoned for recreational use with a special purpose designation for active use. It is not located within an Empowerment Zone, but it is within one of Philadelphia’s Health Enterprise Zones. The land used to be the site of a leather tannery and became contaminated with chlorine-based chemicals before becoming vacant. “In 1987, the EPA’s Superfund Removal Program removed 1,000 drums and chemical containers from the building and site” (US EPA, 2008, p. 1). A proposal to redevelop the site for loft style housing fell through, the land was donated to the
Northern Liberties Neighbors Association (NLNA). The existing building was too damaged to salvage and forced the city to demolish it and place a $500,000 lien on the property. This stalled any plans the NLNA had and as a short-term solution they decided to turn it into a park. Even though this lien may create another barrier, the act of the land being donated by the city allowed the association to overcome the first key challenge of access to land.

The EPA provided funds to conduct a site assessment and eventually confirmed the site was clear of any contaminants and was considered eligible for greenfield development. With the help of a district councilman, the NLNA convinced the city to absolve the costs of demolition and other debts attached to the land and exemplified the government’s support. In 1997, the NLNA received a grant from the Philadelphia Urban Resources Partnership which enabled them to begin their development plan. As part of the grant, it required the association to match the grant amount through various avenues such as volunteer hours and financing. They later received a second grant from the partnership for drainage (US EPA, 2008). These grants, volunteer hours, and financing efforts were key to accessing capital and building upon their development plan. The record of land donation, absolved liens, grant funding, and community involvement have all exemplified how the NLNA has overcome key challenges related to access to land and capital and support from government and community.

**Redevelopment operations**

The Liberty Lands farm has about 14,000 square feet, or about 16% of the lot, spread over 30 plots that utilize conventional farming methods (Figure 3-6). It is unique that the farm uses conventional farming methods rather than raised beds or greenhouses like what were used in the first two case studies, especially in an urban setting like Philadelphia with higher amounts of storm water runoff. This being said, the farm infuses nutrient-rich compost soil like the others to improve waste efficiency and production quality. The farm also uses surface watering methods,
which could be understandable considering the farm is located in a publicly exposed area. Liberty Lands’ annual output is unknown as their membership does not just picking up produce on a weekly schedule. Their membership provides space to be “rented” and maintained by individual gardeners and groups (NLNA, 2012).

The association does supplement itself with other revenue streams outside of the community garden like private events and the management of a farmers’ market. There are also a number of different amenities like a picnic and playground area, open space, and bathroom facilities. It becomes more understandable as to why only 16% of the park is being utilized for farming when the site offers a variety of activities.

Funding for Liberty Lands come from volunteers, memberships, grants, matching gifts, private support, individual donations, and fundraising events, much like that of the other two case studies. NLNA’s most recent update for their 2017-18 financial year, which has only included the last 10 months ending on July 31st, indicated $298,906 in annual revenue of which 41.7% ($124,766) were generated by grants. With $264,057 in annual expenses, the revenue less expenses result in a positive balance of $34,849 (NLNA, 2018). When the report excludes grant fund activity, it equates to a $14,700 positive balance (NLNA, 2018).

Conclusion

The neighborhood of Northern Liberties does not suffer from low-income or low-access to healthy food but there is something to be said about its high obesity rate among the case studies. Lack nutritional awareness and poor eating habits may be to cause. Philadelphia has been progressive in their support urban agriculture in a number of ways like designating an urban agriculture use category, relaxing regulation, and more importantly focusing on access. The ability to sell in a wide range of zones and focusing on increased access at transit nodes are where
the most significant. However, in comparison to the others, there does seem to be a gap in the promotion of awareness and knowledge. This aspect has become evident in Liberty Lands’ case.

Liberty Lands’ also exemplifies the ability of a community to have political influence when vying for government support and grant funding. These actions made it possible for the community to overcome the key challenges of access to land and capital. The farm has also been an example complementary piece to the larger operations. The NLNA has been able to diversify the activities and revenue streams. With greater efforts in nutritional awareness and knowledge, Liberty Lands is capable addressing another community issue that can be solved with urban agriculture.
Figure 3-1. Adjacent Zoning, Windy City Harvest, North Lawndale, Chicago. Modified from source City of Chicago. (n.d.). Zoning and Land Use Map. Retrieved from City of Chicago: https://gisapps.cityofchicago.org/ZoningMapWeb/?liab=1&config=zoning

Figure 3-2. Aerial Farm View, Windy City Harvest, North Lawndale, Chicago. Sourced from Google. (n.d.). Google Maps. Retrieved from Google: https://www.google.com/maps
Figure 3-3. Adjacent Zoning, Lynchburg Grows, Lynchburg. Modified from source City of Lynchburg. (n.d.). Parcel Viewer. Retrieved from City of Lynchburg: https://mapviewer.lynchburgva.gov/ParcelViewer/

CHAPTER 4
CONTEXT AND RECOMMENDATIONS

This chapter analyzes the context of the Cabot Koppers site in relation to surrounding community and greater Gainesville area. The analysis will begin with an overview of county- and city-wide planning, policies, and development. This will allow for a better understanding of the vision and direction the local governments as it pertains to their governing lands. Following a brief site history, a linkage between blight and a need for redevelopment will be established through the process of “finding necessity”. Then, the analysis will cover a more detailed local overview the demographics, land use, functionality, and transportation infrastructure of the surrounding Cabot Koppers area. Next, a review of the stakeholders involved, past remediation efforts, and their proposed vision and plan for the area. Finally, the analysis will conclude with an opportunities and constraints section.

Once the context analysis has been completed, the second half of the chapter will provide recommendations integrating urban agriculture into the brownfield site. The recommendations will include an overarching concept, the types of urban agriculture and programs to be implements, locations and area percentages for urban agriculture, and finally, suggested changes or utilization of existing comprehensive plans, policies, zoning, partnerships, resources, and funding. The purpose of this chapter is to address the thesis’ third objective by critically analyzing the existing conditions and recommending the most suitable strategies for implementing urban agriculture into the Cabot Koppers brownfield site.

Context Analysis

County- and City-wide Planning and Policies

In 1972, the State of Florida established its Growth Management policies through a number of acts that targeted land and water management, water resources, and comprehensive
planning. The acts “provided extensive opportunities for citizens to participate in the planning process that establishes the foundations for managed growth in Florida communities” (University of Florida, 2006, p. 2). The Comprehensive Planning Act of 1972 established an asserted state interest in both state and local comprehensive planning. The intent was to ensure plans were consistent across both levels of government and avoid confusion and duplicated efforts. There are a number of acts that followed to further support this established coordination, including those related to transportation, regional planning agencies, community affairs, and capital improvements (University of Florida, 2006). Florida Statute §187 formalizes the adoption of the State Comprehensive Plan and includes a description of the plan, legislative intent, and the construction and application of plan (State of Florida, 2018).

Florida Statute §163 addresses the powers that municipalities and counties have to plan and manage their future development and growth. The statute welcomes redevelopment and infill through a series of focus areas. These focus areas within the statute cover growth policy, county and municipal planning, land development, community redevelopment, improvement districts, and regional authorities (State of Florida, 2018). The most relevant aspects of the statute to this thesis are ones concerning blight. The statute states that the future land use plan and plan amendments shall be based on “the need for redevelopment, including renewal of blighted areas and the elimination of nonconforming uses which are inconsistent with the character of the community” (State of Florida, 2018). And that an area can be deemed blighted if one or more of the factors defined by the Statute (Table 4-1) are present and all local taxing authorities agree with the determination.

Planning for redevelopment in blighted areas must account for the existing form and uses of the study area, then consider the policy and financial incentives that would be conducive for
change (Hipler, 2012). Florida Statute §163 “emphasizes the importance of state and local government promoting redevelopment and sustaining the core of cities (McGehee, 2013, p. 38). The comprehensive plans, policies and zoning ordinances of Alachua County and Gainesville reflect this coordinated approach.

The Alachua County Comprehensive Plan: 2011-2030, was adopted in 2011 and consisted of the county’s goals, objectives, policies, and maps across 15 elements including future land use, conservation, capital improvements, public schools, and community health elements. The 15 elements for growth and development were based on the key principles listed below (Alachua County, n.d.):

- Housing, transportation, and economic opportunity
- Energy conservation and greenhouse gas (GHG) reduction
- Compact mixed-use development
- Promote local agriculture and resource protection
- Foster a healthy community

These key principles not only helped identify the 15 elements within the comprehensive plan but also contributed to establishing generalized goals for the plan. To help convey this, a poster was created for the public identified the following goals:

- Create more mobility options
- Provide a range of housing options for changing demographics
- Reduce infrastructure costs
- Save on transport and energy costs
- Provide investment and reinvestment in local economy
- Mitigate effects of rising energy costs
- Provide better access for work, shopping, and recreation
- Reduce sprawl
- Promote job creation
- Provide access to nature and creation
- Protect water quality and supply, air, and habitat
- Reduce healthy costs
- Provide opportunities for active living
- Improve local food security
As it pertains to this thesis, there was a common theme within the comprehensive plan concerning support for the local food system within the future land use, economic, community health, and energy elements. The goals and policies can be summarized as the identification of food system opportunities and the promotion of local, sustainable food production (Alachua County, 2017). Currently, the county going through its first evaluation and appraisal process of the plan to assess implementation progress and propose adjustments as needed. The Gainesville Area Chamber of Commerce reviewed the plan in 2015 and gave feedback and recommendations for the economic element of the comprehensive plan. The Chamber of Commerce recognized the importance of the local food economy and recommended further support and encouraging growth (Gainesville Area Chamber of Commerce, 2016).

Alachua County has also established a number of policies that support local food systems. The following policies were included in the Alachua County Comprehensive Plan 2011-2030 (Alachua County, 2017):

- Future Land Use Element, Policy 6.1.4: Support the development of markets and programs that promote the sale of locally produced agricultural goods
- Economic Element, Policy 1.1.6c: Highlight local specialty food and farmers markets as part of the County’s tourism marketing efforts
- Community Health Element, Policy 1.3.1: Promote access to healthful, affordable, and nutritious food
- Community Health Element, Policy 1.3.2: Partner with local organizations and develop standards to promote community food systems
- Energy Element, Policy 6.3: Encourage the use of community gardens, green roofs, and edible landscapes by residents
- Energy Element, Policy 6.4: Support and encourage local agricultural operations in the use of sustainable agriculture practices including organic farming
• Energy Element, Policy 9.1.3: Form partnerships to develop and implement educational strategies on the benefits of purchasing locally grown foods

In addition to the comprehensive goals and policy objectives of both the county and city, they established a coordinated path for supporting agriculture within the city when it came to land use and zoning. The Future Land Use Element within the Alachua Comprehensive Plan, Policy 6.1.5, states “Agricultural pursuits shall be allowed in all land use classifications, provided that the health, safety and welfare of the general public and the protection of the natural environment are assured” (Alachua County, 2017, p. 108). Then, within Article 5 Use Standards with the Gainesville Zoning Code, farmers’ markets are allowed annual permits on public or private property for up to four days per week (City of Gainesville, 2017). And in Article 4 of Zoning, farmers’ markets are permitted in transects U6 through U9, DT (downtown), AGR (agriculture), and PS (public service) (City of Gainesville, 2017).

Development and Funding

The City of Gainesville has targeted blighted areas in the past and have introduced with community redevelopment agencies. The purpose of Gainesville Community Redevelopment Agency is to “help underserved regions attract private investment through community partnerships, competitive economic development incentives and improved public infrastructure” (Gainesville CRA, 2018). According to Florida Statute §163, community redevelopment areas, which are served by the agencies, are considered “a special district for which the sole available source of revenue is the authority to levy ad valorem taxes at the time an ordinance is adopted” (State of Florida, 2018). Currently the City of Gainesville has four of these redevelopment areas, none of which the Cabot Koppers is located within. However, if the city and community was interested in creating a redevelopment agency for the area, the area would need to be “blighted”
area and would require public approval. The City also has other business incentives for redevelopment including (City of Gainesville, 2018):

- GRU’s (Gainesville Regional Utilities) Economic Rate which offers reduced energy rate for new or expanding businesses in Gainesville
- Enterprise Zone Savings which are reductions in various development fees for properties located within the Enterprise Zone
- Enterprise Zone Manufacturing Retention / Expansion Incentive Program which aims to retain businesses which are considering relocating and transfers enterprise zone incentives to locations outside of the designated zones
- Qualified Targeted Industry Tax Refund Program which provides tax refunds for every new job created through new or expanding business but must create at least 100 new jobs
- Industrial Revenue Bonds which provides bond issues for manufacturers for property acquisition, construction, machinery, equipment costs, and certain soft costs

These development and funding incentives have been established to attract new businesses and investment back into the Gainesville community. Considering the land size of the Cabot Koppers site, it is reasonable to believe that many types of new developments to this would be able to qualify for some of these business incentives. Aside from general public input, a community redevelopment agency would be the most beneficial and effective method for representing the community’s interest. The next section discusses finding necessity, which will be a key determinant in linking the brownfield site to redevelopment through the effects of blight.

Site History

The 140-acre Cabot Koppers site is located in the urban core of Gainesville, Alachua County, Florida. The site is comprised of two portions, a 90-acre Koppers portion on the western side and a 50-acre Cabot Carbon (simply referred to as Cabot) on the eastern side. Since the early 1900s, the site operated as a wood treating, charcoal, and pine tar facility. For a majority of the century, pollutants and hazardous materials had been seeping into the ground and causing soil
and groundwater contamination. In 1984, the EPA officially listed the site on the Superfund National Priority and in 1990 identified the responsible parties as Beazer East (Koppers) and Cabot Carbon. The parties were ordered to treat the contaminated site and surrounding area in order to protect human health and the environment. The cleanup and remediation processes are expected to be completed by late 2020. At about this time, the EPA will issue its Fifth Five-Year in 2021 and would hope to give approval for new redevelopment on the site. Within the past few years, the city and property owners have begun its public outreach and brainstorming for potential redevelopment projects.

**Finding Necessity**

Beyond understanding the planning goals and policies of the study are, one of the first steps in the analysis process is finding the necessity. Finding necessity can be explained as “identifying the issues of blight criterion that are negatively affecting a neighborhood or district” (McGehee, 2013, p. 36). Using the table in the previous section, Factors for Determining Blight in Florida, and according to Florida Statute §163.340, the analysis must conclude that the area is indeed a “blighted area” as “indicated by government-maintained statistics or other studies, endanger life or property or are leading to economic distress” (State of Florida, 2018). The EPA has conducted four 5-year reviews of the site since 1996 and in the latest report in 2016, the EPA indicated that the site has not been designated as “Sitewide Ready for Anticipated Use” and stated that “hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure” (US EPA, 2016, pp. viii-1). This classification from the US EPA would qualify the site and the surrounding area as blighted under a number of potential criterions including:

- (c) Faulty lot layout in relation to size, adequacy, accessibility, or usefulness
- (d) Unsanitary or unsafe conditions
• (e) Deterioration of site or other improvements
• (f) Inadequate and outdated building density patterns
• (m) Diversity of ownership or defective or unusual conditions of title which prevent the free alienability of land within the deteriorated or hazardous area

The local Community Redevelopment Agency (CRA) originally coined this greater Stephen Foster neighborhood area as the “Northwest Urban Core” when the organization tried to create a new CRA district due to its economic decline (University of Florida, 2017). When the CRA conducted a Finding Necessity Report, the Koppers portion of the site was listed as a major impediment to the future economic growth of the area. Other major issues were also identified such as declining property values, underutilized commercial developments, and aging water, sewer, and storm water infrastructure. An online survey of the public’s opinion concerning the revitalization of the NW Urban Core was made public and reflected similar results to the Finding Necessity Report (University of Florida, 2017).

The county and city have the planning and policies in place to support the redevelopment of this area. According the EPA’s assessment of the site and the criteria set forth by Florida Statue §163.340 for designating blight, the area should be redeveloped. The next section further details the context of the Cabot Koppers site and the surrounding community, the stakeholders involved, the vision and plan for the area, and the variables, opportunities, and constraints presented.

Local Analysis

Demographics

Gainesville, Florida is the largest city in Alachua County and is situated in North Florida. The city is centrally between the three major cities of Jacksonville, Orlando, and Tampa. It is about 70 southwest of Jacksonville, 110 miles north of Orlando, and 130 miles northeast of Tampa. The general concept of Gainesville-Alachua County is that of “a geographic area
consisting of a large population nucleus together with adjacent communities having a high degree of economic and social integration with the nucleus” (Gainesville Area Chamber of Commerce, 2016). Be it that Gainesville is the nucleus of Alachua County, they both have very similar demographic and economic characteristics and have a strong relation to the University of Florida. Their populations are racially diverse, have low income levels, and property is relatively cheap. This reflects the impact of the university on the community as much of its residents are young, renting housing, not working full-time jobs, and from various backgrounds and geographies. Additionally, large industries and employment opportunities revolve around the university’s operations like educational services, health care, scientific and technical services, and the entertainment and food services industries.

The census tract that the Cabot Koppers site is located in has considerably different attributes compared to Alachua County and the City of Gainesville. The tract is located only 1.5 miles from the center of downtown and yet, the population density is only 76% of the population density value of the entire city. This may be attributed to a small proportion of the tract being occupied by a commercial corridor, but it is also worth noting that the vacant Cabot Koppers site accounts for 15% of the total land area. The median age of the tract is over 10 years older than the county and about 16 years older than the city. Homeownership is below the county but inline with the city average. However, median household incomes and median property values are significantly less than the county and city. Median household incomes are 56% of county value and 76% of the city value. Median property values follow this trend, at 60% and 70% respectively. The unemployment in the census tract is 2-3 times as high. Households utilizing SNAP are 1.5 to 2.5 times higher. Additionally, 80.2% of persons in census tract have health
insurance compared to 87.7% in the county and 86.9% in the city. Table 4-2 displays a complete county-to-city-to-census-tract demographic comparison.

Alachua County and the City of Gainesville reflect a characterization of a young, college town with below nationwide incomes and property values. However, it is easy to recognize the blight and necessity to redevelop in the census tract because of its much higher median age and significantly lower median incomes and property values compared to the rest of the county and city.

**Existing land use, functionality, and transportation**

The existing land use for the site is industrial and the areas surrounding the Cabot Koppers site include residential, public facilities, industrial, commercial, and mixed-use. Due to the size of the site, many land use functions need to be considered when planning development. The most noticeable land use distinction within the census tract is the transition from the single-family residential uses to the west and northwest, to the industrial core where the site is located, to the commercial corridor on the east (Figure 4-1). These areas have distinctively different uses, characteristics, and potential interests for development.

The functionality of the census tract is indicative of its land use map. The majority of the census tract is comprised of a concentration of residential uses (Figure 4-1). The most significant of these is the Stephen Foster neighborhood, the single-family residences west and northwest of the site. With this area are established, low-income families potentially with school-aged children. The area is also complemented by the Stephen Foster Elementary School and various small, neighborhood-type businesses. Mixed-use, low intensity businesses with some medium density residential uses are located just south the census tract. The ratio of residential building types, single-family-to-multi-family structures, is roughly 5:2 (University of Florida, 2017).
Aside from the public facilities area to the north, the core of the census tract is comprised of the Koppers portion of the Cabot Koppers site. This Koppers site is currently vacant with only remediation testing and treatment being conducted. A right-of-way (ROW) parcel splits the two proportions of the site. The ROW has periodical utilization of the existing rail and additional industrial and commercial uses are located to the northeast. The Cabot portion of the Cabot Koppers site is situated in the southeast corner of the tract, along NW 23rd Avenue and Main Street. The Cabot portion includes parcels with industrial, commercial and mixed-uses. The area is currently occupied by a number of small industrial businesses, an automotive dealership, and an underutilized shopping center. A strong commercial corridor, which leads to downtown Gainesville, is just east of the census tract and includes an automotive mall.

The tract has an array of transportation options surrounding the site including local roads, larger interstate and state roads, as well as public transportation, rail, and aviation services. Coinciding with the land uses surrounding the area, local roads with sidewalks are prominent in the adjacent northwest, west, southwest, and southern areas. Larger interstate, state roads, and heavier commercial roads encompass much of the northern, northeast, east, and southeast regions. Connectivity through the site is not currently present but is expected to improve given the size of the site. Future active transportation networks would seem to be more likely on the west and northwest sides of the site whereas heavier automotive transportation infrastructure would be more likely to the east and southeast. There is potential for the ROW portion of the site to be converted into active transportation which would serve as an extension of the area’s Greenways and Trail System.
Site Analysis

Stakeholders

There have been numerous stakeholders involved in the remediation and redevelopment process of this site. Public-sector stakeholders include the City of Gainesville, the University of Florida, and the surrounding Stephen Foster community. The City will typically voice the opinions and interests of the general public. The University of Florida has been the primary purpose and economic engine of Gainesville for the majority of its existence. Large developments like this are sure to involve or consult with the university before any plans or decisions are made final. The Stephen Foster community specifically provides input to the city and developers concerning the needs, wants, and concerns of the people who are directly affected by the contamination and redevelopment. The may focus their attention on promoting greenspace and healthier living conditions. The City of Gainesville would do the same but may concern itself with broader aspects such as increased tax base and economic development. The EPA and other local environmental protection agency focus their input and efforts toward the cleanup and remediation process to mitigate environmental and health concerns; they would probably not concern themselves with the actual so much that it doesn’t interfere with the site’s continual remediation.

The responsible parties for the contamination are also considered vital stakeholders. These two parties, Koppers (known as Beazer East) and Cabot Carbon, will perpetually be involved with the site until complete restoration is completed. This process of complete restoration may take hundreds of years before the parties are deemed forbearance of their responsibility. Beazer East is still the owner of the Koppers however Cabot Carbon no longer owns their portion but remains a responsible party.
The majority parcels on the Cabot Koppers site are owned by the private-sector with a few vacant lots totaling roughly 3 acres. The City of Gainesville also owns two lots on the Cabot portion totally another 3 acres. Private-sector property owners include Beazer East on the Koppers proportion and a number of owners for on the Cabot portion; including P&J Marina, Marchesini & Marchesini, Religh Frust, Dean & Dean Trustees, LP Office Complex LLC, and CSX Transportation. Private-sector owners’ control about 134 acres of the total 140-acre project site.

**Past remediation efforts**

Once the responsible parties were identified by the EPA, they then become legally responsible for funding the cleanup and remediation process. The initial remediation plan installed some institutional controls associated with the site. These policies were enacted in agreeance with the City, Alachua County, and the St. Johns River Water Management District. These policy controls were included to ensure the future land use changes did not affect the protective measures put forth or to be put forth. A 500-foot buffer was created around the site and any new developments within “Special Environmental Concern Area” needed special approval by the EPA the Florida Department of Environmental Protection (FDEP), the Occupational Safety and Health Administration, and the responsible parties. The three major policies relating to this buffer zone are to restrict the installation of groundwater wells and to restrict the use of on-site groundwater and soils. In addition, there are controls to review the use of off-site soils. Overall, there is a heightened awareness and enforcement for submittals, permits, reviews, and approvals between the City, the EPA, and other agencies to reduce exposure and ensure development avoids negatives impacts (US EPA, 2016) all of which are extremely critical to the site and community.
There have been varying attempts to eliminate the contamination and many more planning activities to be continued beyond 2017. Early investigation of the actual contamination started in 1977 by the FDEP in the Hogtown Creek where it was found to be “devoid of life”. The EPA then got involved and after a remedial investigation and feasibility study, and the site was officially listed on the National Priority List (NPL). In 1990, the EPA signed a Record of Decision (ROD) that explained the remediation plan for the site (US EPA, 2016).

In 1995, on the Cabot Carbon portion of the site, a groundwater interceptor trench was installed to replace an interim drainage system along with an engineered swale to replace a roadside ditch. The purpose of these engineered systems was to prevent the discharge of on-site contaminated groundwater into the neighboring sites. Also, in 1995, the groundwater extraction system was implemented on the Koppers site for the Surficial Aquifer to pump, extract, treat, and transfer the contaminated water to another local treatment facility. From the late 1990’s to early 2000’s, the primary actions included a lot of monitoring and studying of extraction well and trench data. Besides some interim remedial actions completed by Beazer like the removal of contaminated building and foundations, one of the most important findings was discovered in 2002 and 2003. During this time, Beazer had discovered and confirmed that there was contamination in the Hawthorn Group and Floridian Aquifer below the Surficial Aquifer. In 2005 after some time of planning, the installation of extraction wells began and then were completed in 2010 (US EPA, 2016). In 2011, removal of tar-impacted sediments was executed in the Springstead and Hogtown creeks; Cabot was also required to remediate new areas found to be contaminated with an in-place treatment technology. In 2014 and 2015, Beazer completed an off-site soil replacement project in the surrounding remediation zone to remove any contaminated soil on all 89 properties within a designated remediation zone (US EPA, 2016). As
one can tell, the remediation process since it’s 1995 ROD has been a long, ongoing process involving many different methods of investigation and implementation. Various studies lasting multiple years and physical improvements ranging from scraping tar from a stream to drilling a 200-foot well were executed. It has been a very cumbersome process to properly address a superfund site. Future activities will include creating a fixed wall surrounding a roughly 34-acre area, installing specifically engineered soil systems, trench upgrades and maintenance, capping the entire area with topsoil, and most likely further investigation. With the majority of remediation efforts being concentrated in the eastern and southeastern areas of the Koppers portion, there is potential for less complicated or impeded development to the north, northwest, and western sides of the Koppers portion. This site is to be monitored for a long time to come, well past the development of new buildings and homes.

**Future land use and development**

The Future Land Use (FLU) Element of Gainesville Comprehensive Plan regulates the use of land in their FLU Map (FLUM). Each FLU designation establishes guidelines and permitted uses for property owners and developers to follow. However, when redevelopments of this size span across multiple FLU designations, such as industrial and mixed-use medium intensity, the inconsistencies make it difficult to for large-scale developments given their various regulations. In these situations, it is common for amendments to the land use and zoning to ensure a more consistent, wholistic development.

The Cabot Koppers site currently has four onsite FLU designations: Industrial, Commercial, Mixed-Use Medium Intensity, and Right-of-Way with railroad use (Figure 4-2). Although there are similarities between designations, the surrounding area is mostly inconsistent with the site, varying in intensity and permitted uses. Thus, depending on what types of
developments are proposed for the site, it is possibly that an amendment to the Comprehensive Plan’s Future Land Use Map (FLUM) would be required.

This land use inconsistency would also apply to corresponding zoning as well. The site area includes five zoning designations, including: General Industrial (I-2), Limited Industrial (I-1), Mixed-use Low Intensity (MU-2), Automotive-oriented Business (BA), and General Business District (BUS). Similar to the reasons for amending the FLUM, a re-zoning amendment would seem likely to improve zoning consistency.

However, whether the land use or zoning amendments happen or not, the newly planned development must correspond with the goals, objectives, and policies set forth by the Alachua County and City of Gainesville Comprehensive Plans. These planning document establish standards and regulations that limit sprawl, support infill development, promote a range of housing options, and increase access, connectivity, and mobility. The Cabot Koppers site is further regulated by the Land Development Code which focusing on the form of development including building height, setbacks, and intensity.

In conclusion, portions of the 140-acre site are inconsistent with on site and adjacent uses due to the size of the Cabot Koppers site. It is likely that new developments would be required to seek approval for land use and zoning amendments that would increase the overall consistency of the area. However, it would be a principal purpose for new developments to coincide with the Alachua County and Gainesville Comprehensive Plans that set forth the community’s goals, objectives, and policies.

**Opportunities**

The first opportunity for development reiterates the various uses surrounding the site. Because the site is adjacent to both residential and non-residential land uses, this gives the site flexibility for its future land use. Developments that shift more toward residential development
would be consistent, and vice versa. The site has an opportunity to become a transitional area that smooths the consistency from heavy residential to heavy commercial. It would seem likely that a mixed-use, or “transect” use, and zoning designation would be appropriate for the site.

That being said, another beneficial opportunity has to be the site’s land size. Potentially sectioning out the large Koppers parcel into many, smaller parcels could be an opportunity for more defined use and zoning while still maintaining consistency and continuity. Another opportunity is the fact that the Koppers site is largely flat and undeveloped. The site is a blank slate that would require minimal demolition or underground infrastructure modifications. Transportation and connectivity infrastructures are not bounded by existing design and outdated formations. In addition, the Koppers site currently only has one owner who also happens to a responsible party administering the remediation. The Cabot portion does have existing buildings and transportation infrastructure present, but the buildings could be repurposed, and the transportation infrastructure is minimal. Therefore, developers could save money by rehabilitating the buildings and avoiding expensive infrastructure.

Another opportunity for redevelopment is the existing CSX railroad which splits the Koppers and Cabot portions. Currently, the rail is only periodically used and only makes stops north of the Cabot site. There is potential to improve connectivity from site-to-site. Additionally, the CSX railroad is aligned with the region’s Greenway and Trails system. There is potential to create a critical link in the system which feeds toward the urban core of the city and county.

As the City of Gainesville continues to promote its Innovation Square, a business incubator which is situated closer to the university and downtown, there will become a need for these incubated businesses to “graduate” into a sustainable business-like environment. It is possible that this site could be the home for future growing business and an office park.
When considering housing for the site, it is important to understand local demographics. As previously explained, this area has experienced higher than city-wide owner-occupied house rates (42.4%) but overall, the city filled with college students looking to rent. There have always been opportunities to build the newest apartment complexes in college towns but would need to consider the saturation of competition and a 13.77% renter-vacancy rate (Census ACS, 2017). The could be potential opportunity to include some housing development as transition from the west to east sides of the properties; from single-family housing on the west, to multi-family, to apartment complexes, to the commercial corridor on the east.

Considering both residential and commercial developments, or a mixture of the two, is important as these are the two main functions surrounding the Cabot Koppers site. A proposed development should consider a remedy that accounts for the immediate and dominant audience members surrounding the area. To a broader extent, it is also important to recognize the opportunities and resources located around the city, such as the University of Florida, Santa Fe Community College, Innovations Square, the downtown district, and the Gainesville Regional Airport. The wealth of resources, including young talented college students, should without a doubt be utilized.

**Constraints**

The Cabot Koppers site also features a number of constraints that could influence the size, use, and functions of the site. Half of these identified constraints are beyond the control of prospective developers and could complicate or impede development. Figure 4-3 includes a map and list of 10 constraints developers would encounter when planning for redevelopment.

Site access if the first constraint of the Cabot Koppers site. Currently, the 140-acre site only has access to three points of ingress and egress. Two of these points are located on the Cabot site along NW 23rd Avenue and Main Street. The other point is located on the Koppers site
along NW 23rd Avenue. Considering the size of the site and the potential to attract large volumes of people and automobiles to this area, there is potential to create significant congestion along NW 23rd Avenue. In addition, this is a state road which would mean the Florida Department of Transportation (FDOT) has the ability to “require significant and costly improvements to local roadway infrastructure if the site’s future developer desires to expand their sole access point” (University of Florida, 2017, p. 40).

Another major constraint that was briefly touched upon was the fact that the site encompasses multiple parcels with various uses and a number of owners. The multiple land uses, and zoning regulations create conflicting and inconsistency for comprehensive development. As mentioned, an amendment to the FLUM and zoning would most likely be required. The requested changes can be costly and take several months for approval.

The purchasing of multiple parcels would require multiple owner negotiations with the possibility of clashing interest and inflated land prices. The complexity of coordinating such a purchase has the potential entirely derail the project. In addition, what was considered an opportunity to rehabilitate existing buildings on the Cabot may also be a constraint if these structures don’t fit into the developer’s vision. Required demolition has the potential to become costly.

As a part of the remediation process, Beazer East has constructed a permanent onsite water treatment facility on the Koppers property, next to the CSX railroad. The facility must remain throughout the site’s development as it required by the EPA for them to treat onsite water. There may be a possibility to move the facility, but it is expected to be very costly and would not be recommended. The structure itself creates visual blight and would need to be disguised or somehow incorporated into the development.
One of the greatest constraints for future development is the proposed cap and wall system that will be installed underground to contain the contaminants. The underground cap and wall system will cover many acers on the Koppers portion beginning from the southeast corner. Furthermore, the site has an extensive number of expensive wells located throughout the site that would accrue significant costs if removed or relocated.

The remediation efforts on the Koppers portion have been underway for some time and approval for new development is expected around 2020-2021. However, the Cabot portion of the site is likely in need of remediation as well. The costs and process of doing such may deter developers as the scope and extent of this procedure are not currently known. It would be risky for future developers to take on such a task. They may be best advised to leave a small building footprint over the Cabot portion to mitigate the risk of not knowing the required actions of the site’s future remediation.

**Recommendations for Development**

The section of the chapter will detail the author’s recommendations for answering the research question stated in the beginning of this thesis: How to integrate urban agriculture into the Cabot Koppers brownfield site. The recommendations are based on the evidence already presented, including why brownfields can be problematic for cities; what the benefits and strategies are for implementing urban agriculture; the cross-case analysis the three urban agriculture cases studies; and the contextual analysis of the Cabot Koppers site and the surrounding area. A site-specific proposal will be presented, and it will combine features from the case studies and be fitted for the socioeconomic characteristics of the Cabot Koppers site. This proposal will include a general concept with projected outcomes.

Following this brief proposal, the strategies required for implementing this urban agriculture plan will be supported by the literature and case studies previously examined. These
strategies to be presented will follow the case study analysis structure by focusing on vital aspects such as planning and policy, business operations, partnerships and resources, and funding. A summary of the integrating strategies will complete this chapter. For the sake of reference, the name of this proposed farm will be CityAg Farms.

**Proposal Concept**

The concept of this development proposal is to implement urban agriculture in a complementary way that appeals the surrounding community and strengthens local food systems. The Cabot Koppers site is 140 acres in size and given the site’s urban location, it is reasonable to assume that both, developers and city officials, would prefer this land to be a significant revenue generating property rather than a farm. And to that point, it is suggested that the urban agriculture operations on this site be a complementary piece the grander development.

As it was mentioned, development of this size, spanning over multiple land uses and property, has potential to have conflicting interests. Though public interest and involvement in the planning process is becoming more prominent, in many cases, their interests are given way to private development and increased tax bases. However, an integration of some urban agriculture could go a long way in the publics’ acceptance of private-sector development interests. In some cases, such as rooftops garden, the agriculture does not take away from private operations and may even help attract residents and customers to the places of business.

The purpose of integrating urban agriculture has been primarily driven by the communities need and the local government’s goal to support local food systems. The census tract that the site is on is located in a food desert and adjacent tracts the east also suffers. Demographics have indicated a need to greater access to healthy food options. The tract experiences a higher level of households using SNAP, higher food insecurity rates, and a lower percentage of people with health insurance. In addition, the tract suffers from significantly lower
household income and property values. Access to healthy, affordable food options may not be a one-stop solution but it has potential to be a small step in the community’s progression.

Proposal Outcomes

The proposal’s primary purpose will be to serve the publics’ need for access to local healthy food and will be set up under a non-profit organizational structure. CityAg Farms will start out as an urban farm, rather than a community garden, and as so, the employees will be the ones managing operations, producing food, and providing services. However, the farms operations will utilize volunteers as possible but on a limited, more defined basis.

The design of CityAg Farms will utilize the unique site’s characteristics and modern urban agriculture techniques. The Cabot Koppers site is 140-acres in total and equates to about 6.1 million square feet of developable land. CityAg Farms will be proposed as a 4.2-acre farm with 100,000 square feet of growing space. A 4.2-acre farm may seem large for an urban setting, but it will only be taking up 3% of the site’s property and would be more likely to seem socially conscious if the farm had some considerable size to it. The farm would be located closer to the middle or north section of the Koppers portion. It will be assumed that property located along NW 23rd Avenue and Main Street would be too valuable not to develop it as commercial or multi-family residential. Additionally, the location of the farm could serve as a transitional use between the Stephen Foster neighborhood and the commercial corridor.

CityAg Farm will utilize raised beds that create a barrier between the food production and the ground below. North Florida’s warm climate make it possible to keep costs down, avoid the need the for greenhouses, and still produce vegetables year-round (University of Florida, 2018). The raised beds will also drip irrigation to maximize water efficiency. Composting will also be used to recycle organic waste and provide nutrient-rich soil.
The farm will also offer a number of programs similarly found in the case studies. CityAg will offer farm memberships for weekly pickups of product. The farm will also have a roughly 20,000 square foot area for farmers’ markets, food trucks, and events. The farm will also offer a weekly delivery service for fresh foods to people who are unable to travel to the farm. It is expected that the farm will partner with local businesses and restaurants to offer farm fresh products. In addition, a program for youth involvement would be established to help promote nutritional awareness and knowledge. A partnership with the city, local schools, churches, and food kitchens seems natural to offer programs to help promote access to healthy foods for those whom may not be able to purchase the products otherwise.

Once CityAg has moved evolved their initial development phases and into fully capacity production, it is projected that the 100,000 square foot farm will generate the following outputs, displayed in Table 4-3. These projections are based on the average outputs of the Lynchburg Grows farm. The Lynchburg Grows farm most resembles the structure and operations of the CityAg proposal. Both mid-sized college towns have similar demographic and socioeconomic factors, comparable comprehensive plans and policies, exactly the same programs being implemented, and their growing potential and methods for farming are most alike compared to the others.

In summary, the CityAg Farms proposal is to create a non-profit organization that serves the surrounding communities and greater public. The size of the farm is key in that it would be large enough to make a visual impression but small enough not to overly compromise potential revenue the site may generate. Florida’s warm climate provide an advantage that should be exploited. Cost-effective raised beds and drip irrigation can keep development and maintenance costs down. Partnerships with community, local businesses, and university will be key to the
support of operations. The inclusion of an organization like this combined with its visual presence could be a valuable tool in development negotiations and decision-making.

**Strategies for Delivering Proposal Outcomes**

The following sections will include strategies for integrating the urban agriculture proposal into the Cabot Koppers site. The implementation strategy will include aspects identified in the literature review, the three case studies, and the existing conditions within the context of Cabot Koppers and the Gainesville area, including local laws and regulations. The overarching goal of the proposal and its strategies are to improve local food systems as well as social and health welfare.

**Planning and policy**

The planning and policies required to successfully implement this urban agriculture venture into the Cabot Koppers are pretty much in place already. The reason why this proposal is feasible is because of the existing comprehensive plans and policies. However, there are some instances where clarification of the law or slight modifications may be needed when it comes to zoning regulations.

First, the Alachua County Comprehensive Plans that were presented undoubtedly supported the promotion and growth of local agricultural food production. The county’s commitment to local food production was evident in four of the fifteen plan elements including the future land use element, the economic element, the community health element, and the energy element. In comparison to the case studies, the goals stated in the Alachua County Comprehensive Plan are aligned with the more progressive cities like Chicago and Philadelphia. These comprehensive plans make it a point to single-out the importance of local food system. The City of Lynchburg was far more general about their commitment and it was evident with the majority of their city experiencing food deserts.
Second, the policies set forth by Alachua county also support their commitment to promoting their local food system. The have established a number of policies that support the development of farmers’ markets, programs that sell locally produced agricultural goods, and have highlighted local specialty foods and farmers’ markets as a marketing tool for tourism. Additionally, the county has indicated a need to partner with local organizations to increase access to healthy food options as well as develop standards and educational strategies that promote community food systems and the benefits of purchasing locally. They also included the encouragement of community gardens, green roofs, and edible landscapes. The strength of these policies is also consistent with those of Chicago and Philadelphia. They focus on addressing some of the major concerns and consistently focusing on three aspects: access, production, and awareness.

Thirdly, the zoning regulations in Gainesville have provided some support for integrating urban agriculture but is rudimentary in comparison to Chicago and Philadelphia. The zoning regulations for Gainesville are more similar to the ones in Lynchburg, Virginia. Both municipalities address where urban agriculture can occur but leave it at that. The generalness of the zoning regulations for this specific use leave questions as to what is acceptable or required. Gainesville does allow for agricultural pursuits in all land use classifications provided that the health, safety, and welfare of the general public and the natural environment are assured. Based on this, agricultural development would be allowed on Cabot Koppers and would only to need to coincide with land development code (urban form) for that area.

In both Chicago and Philadelphia, the zoning regulations are much more defined, possibly due their lack of urban space and need to limit size. Lynchburg and Gainesville have the ability to sprawl (even if not encouraged) whereas this is not as possible in the other cities.
Philadelphia has gone as far as creating a standalone use category for urban agriculture. Gainesville could benefit from creating more detailed urban agriculture zoning regulations such as lot size, parking exceptions, barrier fencing, compost standards, or designed drainage but it may not necessarily be needed at this time.

In conclusion, Alachua County and the City of Gainesville have already established goals, policies, and zoning regulation that are conducive for integrating urban agriculture. These goals and policies are in-line with some of the more progressive urban farming cities such as Chicago and Philadelphia. There are opportunities to improve and create more detailed zoning regulations that provide better clarity as to what is possible. However, it is not suggested that these zoning regulations must be amended as it does not seem to be an impediment to the integration.

**Development adjacencies**

The redevelopment of Cabot Koppers which includes the CityAg proposal must address the three key challenges identified in the literature: access to land, access to water, and access to capital. However, there is an important prerequisite related to land use and zoning that must be addressed. It was covered in the previous section that, per Gainesville zoning regulations, agricultural pursuits are permitted in all land uses; effectively negating any land use or zoning conflicts. That being said, not all municipalities may have this luxury or desire. Therefore, ensuring appropriate land use and zoning regulations would be one of the first hurdles in redevelopment. This step can be a challenge as land use and zoning changes typically take several months before given the opportunity for approval. It is the author’s belief and recommendation that the Cabot Koppers site will be rezoned as Mixed-Use, Medium Intensity. The reason being its location between residential and commercial uses, its general location near
Main Street and a strong commercial corridor, and the intensity of other adjacent mixed-use parcels. Figure 4-4 displays the Cabot Koppers surrounding land uses.

Complementary to this rezoning is understanding what adjacent uses or zones immediate surrounding the potential farm, either onsite or off, may be more or less conducive for operations. In all three case studies, every urban farm has an overwhelming number of residential zones immediately adjacent to their properties. These designations vary in intensities and housing types. Additionally, each case study also has distinctively unique adjacencies outside of residential. Windy City Harvest is within a neighborhood commercial district with adjacent residential and business zones. Lynchburg grows is within a heavy industrial area with adjacent residential (varying intensities) and general business zones. Liberty Lands is located on a special purpose lands zoned specifically for “active” open space and parks. This property is surrounded by residential, other open space and parks, and community mixed-use zones. In Cabot Koppers’ case, situating the farm off the main streets allows private developers access the valuable assets of the site and locates the farm closer to the primary beneficiaries of the farm, the neighborhood community. Additionally, by locating the farm somewhere in the north or northwestern area of the Koppers portion, this places the farm’s operations in the least contaminated areas of the site. The key takeaway is that it doesn’t matter so much what the surrounding nonresidential zones are, as long as the farm is adjacent to considerable amount of residential areas. Figure 4-5 proposes potential spatial relationship, within the Mixed-Use, Low to Medium Intensity land use, that may be conducive for CityAg.

**Access to land, water, and capital**

Access to land is suggested to be a part of the larger redevelopment proposal set forth by the developer or recommended by the city. The inclusion of an organization and operation that promotes social and health welfare can be used a bargaining chip or mutual compromise between
the private- and public-sectors. In the Windy City Harvest case study, the urban land trust recognized the importance of integrating urban agriculture into low-income neighborhoods. Lynchburg Grows access to land was propelled by the interest the previous landowner and in Liberty Lands, it was the collective interest of the surrounding neighborhood convinced city officials.

The proposal only suggests 3% (4.2 acres) of the land be used for serving the public. It is reasonable to believe that a project this size will be able to offer 4.2 acres out of the 140-acre total and not be overly compromising revenue or tax base. It is even possible that a site this large may decide to include a park and the required land could incorporated into that portion. Access to land, at least on the Koppers portion, seems to be a fairly feasible outcome.

Access to water will be one of the more difficult challenges of the site. However, it is expected that water will either need to be filtered onsite (to a higher quality than already) or piped in to be consumable. Allowing the farm access to the site’s water supply seems practical to the overall development. CityAg’s leverage to use of drip irrigation will keep farm water costs down and maximize water efficiency just like the case study involving Lynchburg Grows. In addition, to access to water, it will be just as important to ensure water quality. Periodic testing of the water supply would help the creditability of the remediation and mitigate the risks and concerns for food production on a brownfield site.

Access to capital would be expected to come from government and private organization grants and fundraising. Additional donations and partnerships with local institutions may also be an avenue to raise capital. In all three case studies, the non-profit organizations received financial support from both the public- and private-sector organizations. CityAg’s strategy would be similar and contingent on this type of funding. Therefore, securing funding will be one of the
most challenging aspects to ensuring development and sustainability. See the Funding and Financials section for greater detail.

**Actors involved**

After addressing land use and zoning, access to land, water, and capital have been covered, other considerations to be taken into account would include the other actors involved, community acceptance, and internal operational factors. The actors involved that are most likely to have conflicting interests and reformations would the private developer and environmental and health agencies. A private developer may see the farm as a lost opportunity for development but for reasons mentioned before, an urban farm may be a valuable compromise in winning over public approval for the grander development. Furthermore, it is realistically difficult to envision the entire 140-acre site being utilized for any one use or one that doesn’t involved greenspace. Environmental and health agencies may also hesitate at the approval of an urban farm on this brownfield site but through the use of modern agriculture, it is expected that the farm would be able to ensure food quality by creating barriers between the growing areas are the contaminants below. The community might have some resistance to the idea of an urban farm but based on their public survey, greenspace is at the top of the list for community wants.

**Internal operations and programs**

Internal operational factors are also to be considered important strategies requiring attention. It has been stated that location of the farm should be situated near residential zones to emphasize their local presence and proximity to their primary customer; all three case studies support this environmental characteristic. The types of farming methods implemented should be one of the primary concerns along with funding. As previously stated, ensuring food quality would have the utmost priority when devising a faring strategy. Raised beds with treated drip irrigation and recyclable compost would be the basics methods for doing so. Both Lynchburg
Grows and Windy City Harvest employ raised beds with recyclable compost methods to counter their site’s contamination. In addition to these methods and as previously mentioned, it may be advantageous for the Gainesville and / or CityAg to conduct, and publish, periodic testing of the water the supply and produce to ensure quality and strengthen confidence with the public.

Other internal operational factors would also include the variety of programs and services that CityAg could offer. Outside of grants and fundraising, the primary source of revenue is expected to come through community memberships. These memberships would most similar to the ones being implemented in the Lynchburg Grows Farm. Members of the CityAg Farm would pay a fee for weekly pickups of produce and products. It is the plan to have the produce and products sold below market value because of the organization’s non-profit structure. This strategy allows for household to increased access to healthy food within a current food desert while simultaneously reducing their food expenditures.

Other complementary programs may include agreements with local restaurants and business to provide fresh fruits, vegetables, and products which can be marketed and advertised. Programs with local schools could help provide healthy, affordable food options for kids who may otherwise not have access to them. Agreement with local churches and places of religion may also be a possibility. Two of the three case studies included all three of these programs already mentioned in this paragraph. The farm could also provide a delivery service (like Lynchburg Grows) or various farm stand locations around the city (like Windy City Harvest) to help increase access to locations that may otherwise be food deserts. However, the purchasing of a delivery vehicle and need for a driver may need to be held off until after the farm establishes a presence. This was a strategy employed by Lynchburg Grows to expand their reach and impact.
Partnerships

All three case studies utilized local partnerships to support either their funding or operations. Each farm had a multitude of partnerships for different reasons but there were a few that stood out in each case. Windy City Harvest had strong partnerships with the Chicago Botanic Gardens (CBG) and Lawndale Christian Community Development Corporation (LCCDC). CBG supported the implementation and management of their programs while LCCDC helps further fund and expand their efforts into the community. Lynchburg Grows has formed partnerships with their local universities for volunteer and internship help. They have also partnered with St. Joseph’s Episcopal Church to help support fundraising and outreach. Liberty Lands is managed by a neighborhood community but has seeks support through regular interaction with local city officials.

There is a vital importance to establishing partnerships so that CityAg can be better equipped to overcoming key challenges and considerations. Access to land and water are will need to be challenges that are strategically negotiated with developers and the city and curtailed to the surrounding environmental factors. But, access to capital, program structure, and operations will rely heavily on the formation of partnerships within the community. Potential partnerships could include the Stephen Foster neighborhood, local schools, and the University of Florida. These three partnerships could support farm membership, outreach programs, and volunteer / internship help. Partnerships that provide funding (or reduce expenditures) have been found help support the initial development and program sustainability.

Funding and financials

Navigating through policy, development negotiations, access to physical resources, and city approvals can be daunting task for urban agriculture venture. However, funding strategies for the CityAg’s initial implementation and continuous operations will be critical to the success
of the organization. Since CityAg will operate as a non-profit urban farm, it is recommended that the organization target grant funding as their primary source of revenue. These grants are offered by a number of different public- and private-sector organizations. For formality and ease of reference, this recommendation will only include grant opportunities from government programs. Additionally, it will be assumed that the site has completed its cleanup and ready for redevelopment.

It is recommended that CityAg target various EPA-funded Brownfield Economic Development Initiative grants. There are three possible grants that could be beneficial:

- Brownfield Assessment Grant for environmental assessments and community outreach, especially if the site were to consider periodic testing to ensure water and food quality.
- Brownfields Area-Wide Planning Grant for communities to develop implementation strategies for revitalizing specifically affected areas.
- Brownfields Job Training Grant for environmental training for residents and communities.

Additionally, HUD offers a number of funding programs such as Community Development Block Grants, Small Business Association’s Loans, and Section 108 Loan Guarantees that should be explored. Unfortunately, on the local level, the Cabot Koppers site is not located within a Gainesville Enterprise Zone and would not qualify for any other incentives stated on the City’s website. There is potential to create a local CRA district in the area, but this proposal has been denied by the community in the past.

It is highly recommended that CityAg search for governmental funding from the USDA. The USDA has a number of funding programs that target key focus areas such as: business planning and risk management, land access, soil testing, water access and use, capital and finance, infrastructure, market development, and training and mentoring (Table 2-4).
Deciphering what grants were awarded in each study was unclear; however, their IRS filings detailed their grants amount and could possibly be an indication of their level of dependence on these grants. The Chicago Botanic Gardens, parent organization to Windy City Harvest, received grants that amounted to 59.6% of their annual revenue; grants dispersed to Lynchburg Grows amounted to 50.3% of their annual revenue; and, the Northern Liberties Neighbor Association, which manages Liberty Lands, received grants that accounted for 41.7% of their annual revenue. It is believed that CityAg should anticipate similar percentages when accounting for their dependence on grants. In addition, the formation of partnerships may provide additional funding outside the grants and earned revenue stream. The importance of the previous section emphasizes the variety of services partnerships can offer and especially from a funding / reduced expenditure standpoint.

Beyond the funding streams, the financial operations of CityAg is expected to most like Lynchburg Grows in Lynchburg. As previously mentioned, the reason are that both mid-sized college towns have similar demographic and socioeconomic factors, comparable comprehensive plans and policies, exactly the same programs being implemented, and their growing potential and methods for farming are most alike compared to the others. A projected breakdown of CityAg’s financials including revenues from grant contributions and earned incomes; expenses from salaries, rent, and supplies; and net revenue have been located in Table B-1 of the Appendix.

Summary

The strategies for integrating urban agriculture into the Cabot Koppers site should address three areas: planning and policy, redevelopment challenges, and business operations. The comprehensive plans and zoning regulation documents for Alachua County and Gainesville both supports, and promotes, the use of agriculture within the region and its city limits. There could
be room for improved clarity within the zoning ordinances, but the current legislation is conducive for urban farming. It is recommended that planning and policy legislation could benefit from adopting legislation strategies employed in Chicago and Philadelphia.

The adjacent zoning surrounding the CityAg site should predominantly be residential to maximize community presence and potential support. Strategies for addressing key challenges like access to land will need to be concentrated on negotiating the need and benefit of implementing such project within a food desert. Access to water is likely to be a challenge that the entire development site will need to tackle together. The use of modern agriculture methods like drip irrigation are likely to be important strategies for supporting access to water and reducing water inefficiencies. The third key challenge, access to capital, is likely to be the most difficult and should be addressed through multiple avenues. There is capital funding available through the federal and state government, but it is also vital to create local partnerships in an effort to generate sustainable funding and maximize organizational reach. It is recommended that the operational considerations could benefit from understanding and adopting the strategies employed by Lynchburg Grows. Lynchburg Grows most accurately reflect the socioeconomic and physical conditions which are presented at Cabot Koppers. The overall vision for the future of this site is yet to be determined but the integrating such a complementary component may be beneficial for all actors involved. This chapter provides a guideline for an integration strategy by combining comparable case studies with site-specific factors. An integration of this strategy could lead to improved local food systems as well as improved social and health welfare.
Figure 4-1. Census Tract and Adjacent Zoning, Cabot Koppers, Gainesville. Modified from source Alachua County. (n.d.). *MapGenius*. Retrieved from Alachua County: [http://mapgenius.alachuacounty.us](http://mapgenius.alachuacounty.us)
Figure 4-2. Future Land Use Map, Gainesville. Sourced from University of Florida. (2017).

Figure 4-5. Potential Spatial Relationships within Mixed-Use, Medium Intensity, Cabot Koppers, Gainesville. Modified from source Alachua County. (n.d.) MapGenius. Retrieved from Alachua County: http://mapgenius.alachuacounty.us
Table 4-1. Factors for determining blight per Florida Law. At least one of the of the criterion (a through o) must be presented to be qualified as a blighted area (State of Florida, 2018).

<table>
<thead>
<tr>
<th>Criterion Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Predominance of defective or inadequate street layout, parking facilities, roadways, bridges, or public transportation facilities</td>
</tr>
<tr>
<td>(b) Aggregate assessed values of real property in the area for ad valorem tax purposes have failed to show any appreciable increase over the 5 years prior to the finding of such conditions</td>
</tr>
<tr>
<td>(c) Faulty lot layout in relation to size, adequacy, accessibility, or usefulness</td>
</tr>
<tr>
<td>(d) Unsanitary or unsafe conditions</td>
</tr>
<tr>
<td>(e) Deterioration of site or other improvements</td>
</tr>
<tr>
<td>(f) Inadequate and outdated building density patterns</td>
</tr>
<tr>
<td>(g) Falling lease rates per square foot of office, commercial, or industrial space compared to the remainder of the county or municipality</td>
</tr>
<tr>
<td>(h) Tax or special assessment delinquency exceeding the fair value of the land</td>
</tr>
<tr>
<td>(i) Residential and commercial vacancy rates higher in the area than in the remainder of the county or municipality</td>
</tr>
<tr>
<td>(j) Incidence of crime in the area higher than in the remainder of the county or municipality</td>
</tr>
<tr>
<td>(k) Fire and emergency medical service calls to the area proportionately higher than in the remainder of the county or municipality</td>
</tr>
<tr>
<td>(l) A greater number of violations of the Florida Building Code in the area than the number of violations recorded in the remainder of the county or municipality</td>
</tr>
<tr>
<td>(m) Diversity of ownership or defective or unusual conditions of title which prevent the free alienability of land within the deteriorated or hazardous area</td>
</tr>
<tr>
<td>(n) Governmentally owned property with adverse environmental conditions caused by a public or private entity</td>
</tr>
<tr>
<td>(o) A substantial number or percentage of properties damaged by sinkhole activity which have not been adequately repaired or stabilized</td>
</tr>
</tbody>
</table>
Table 4-2. Local Demographic Overview. Comparison at three different scales including Alachua County, the City of Gainesville, and the census tract containing and surrounding the Cabot Koppers brownfield site.

<table>
<thead>
<tr>
<th></th>
<th>Alachua County</th>
<th>Gainesville</th>
<th>Cabot Koppers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area (sq. miles)</td>
<td>875.02</td>
<td>61.31</td>
<td>1.465</td>
</tr>
<tr>
<td>Population</td>
<td>266,944</td>
<td>132,249</td>
<td>2,426</td>
</tr>
<tr>
<td>Population Density (per sq. mile)</td>
<td>305</td>
<td>2,157</td>
<td>1,656</td>
</tr>
<tr>
<td>Minority Population</td>
<td>38.6%</td>
<td>42.8%</td>
<td>31.0%</td>
</tr>
<tr>
<td>Median Age</td>
<td>31.3</td>
<td>25.7</td>
<td>41.6</td>
</tr>
<tr>
<td>Households</td>
<td>96,336</td>
<td>47,922</td>
<td>1,156</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>$44,704</td>
<td>$32,716</td>
<td>$25,119</td>
</tr>
<tr>
<td>Median Property Value</td>
<td>$165,700</td>
<td>$143,900</td>
<td>$100,000</td>
</tr>
<tr>
<td>Homeownership Rate</td>
<td>53.7%</td>
<td>38.5%</td>
<td>42.4%</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>7.0%</td>
<td>8.4%</td>
<td>20.1%</td>
</tr>
<tr>
<td>Percentage of People Below Poverty Level</td>
<td>24.2%</td>
<td>34.8%</td>
<td>26.3%</td>
</tr>
<tr>
<td>SNAP Households</td>
<td>15.2%</td>
<td>11.4%</td>
<td>24.8%</td>
</tr>
<tr>
<td>Food Insecurity Rate</td>
<td>12.7%</td>
<td>-</td>
<td>&gt;16.6%</td>
</tr>
<tr>
<td>Health Insurance</td>
<td>87.7%</td>
<td>86.9%</td>
<td>80.2%</td>
</tr>
<tr>
<td>Adult Obesity Rate</td>
<td>25.6%</td>
<td>20.1%</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 4-3. Projected CityAg Outputs. Compared to similar operations and outputs of Lynchburg Grows.

<table>
<thead>
<tr>
<th></th>
<th>Lynchburg Grows</th>
<th>CityAg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming area (sq. ft.)</td>
<td>70,000</td>
<td>100,000</td>
</tr>
<tr>
<td>Farm methods</td>
<td>raised beds, drip irrigation within greenhouses</td>
<td>raised beds, drip irrigation exposed to outdoor conditions</td>
</tr>
<tr>
<td>Employees</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Employee Hours</td>
<td>8,700</td>
<td>12,000</td>
</tr>
<tr>
<td>Volunteers</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>Volunteer Hours</td>
<td>7,800</td>
<td>11,150</td>
</tr>
<tr>
<td>Output (pounds)</td>
<td>23,924</td>
<td>34,177</td>
</tr>
<tr>
<td>Output (servings)</td>
<td>59,810</td>
<td>85,442</td>
</tr>
<tr>
<td>Donated (pounds)</td>
<td>9,300</td>
<td>13,285</td>
</tr>
<tr>
<td>Food Memberships</td>
<td>115</td>
<td>164</td>
</tr>
<tr>
<td>Food Delivery Stops / Farm Stand Sales</td>
<td>356</td>
<td>508</td>
</tr>
<tr>
<td><strong>Total revenue</strong></td>
<td><strong>$265,955</strong></td>
<td><strong>$379,936</strong></td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td><strong>$236,528</strong></td>
<td><strong>$338,754</strong></td>
</tr>
<tr>
<td><strong>Revenue less expenses</strong></td>
<td><strong>$29,427</strong></td>
<td><strong>$41,181</strong></td>
</tr>
</tbody>
</table>
CHAPTER 5
CONCLUSION

Conclusion

The recommendations for integrating urban agriculture into the Cabot Koppers site were derived by considering the existing literature that could answer: why are brownfield sites problematic for cities; what benefits of urban agriculture can address blight; and what strategies are used to implement urban agriculture. The cross-case study analysis of the three case studies demonstrated to be effective in identifying common implementation strategies and bridging visual relations to site-specific factors of Cabot Koppers and surrounding area. Through this process, it was discovered that the goals of integrating urban agriculture to remove blight and strengthen local food systems are similar across much of the US, regardless of location or size.

This research was guided by the potential opportunity and impact the Cabot Koppers site may have to its surrounding community. The site is expected to be approved for development within the next few years and the effects of its contamination have been felt for generations. It is a critical time to consider all redevelopment options and ask if there is compromise which would be suitable and beneficial for all parties. Property owners and private developers will have the right to develop as they see fit and they are in the business of making a profit. Similarly, the City of Gainesville is embarking on a great opportunity to increase their tax base and potentially create a new economic hub on a once vacant, unproductive, and hazardous site. The outcomes of such an organization, like CityAg or any of those mentioned in the case studies, should not solely be judged on their economics, as it may be a less convincing argument. However, an important aspect to this integration strategy is to consider the redevelopment opportunity with a broader perspective. A perspective that includes social benefit, as well as economic benefit. The inclusion of urban agriculture into the site’s larger redevelopment has potential to significantly
contribution toward achieving social optimality, or an outcome in which the sum of all the participants’ gains are maximized.

Although this thesis only examines three urban agriculture case studies, the resulting commonalities among integration strategies encompass a broad understanding of redevelopment planning. The thesis stresses the concept of complementary redevelopment and optimal outcomes for all parties involved. The Cabot Koppers site does have a few years before construction begins but developmental ideas are already in the works. It is my hope that this thesis contributes to the possibilities to be considered.

**Further Studies**

A more detailed research into the financial aspects of urban agriculture could be conducted. The use of the Lynchburg Grows financials did provide some baseline understanding but potentially more examples could have been provided to exemplify a more accurate picture. Due to time constraints and availability of detailed financial records, it made it difficult to include this greater level of extensiveness. Through the literature review and case studies, it was detected that many urban farms function as non-profit organizations and that they heavily rely on government grants and local fundraising. It seemed like the more successful urban farms had committed followers within the community, events to raise money, and rapport with large donors.

My studies included only three case studies and could have benefitted from more and with a possible wider variety of agriculture methods implemented. The case studies were located in distinctively different geographies, but all used a slightly different method of conventional, soil farming. Additional case studies that utilized aeroponics, aquaponics, roof farms, or vertical farms would have allowed for a broader understanding of the challenges of strategies required.
The inclusion of primary information from community member, city officials, and property owners within the Cabot Koppers area would have been beneficial to the gauge the community’s interest in the proposal and the types of urban agriculture they would have felt more comfortable accepting. Other research could include a more comprehensive assessment of the presence health factors within communities (i.e. health centers and facilities, census tract obesity rate, exercise levels, health or sports programs available, etc.

There is potential to complement or build upon this thesis by including some regression related studies. A regression on the impacts of brownfields on communities could have quantified the effects in relation to distance from the site. Additionally, the effectiveness of implementing urban agriculture into food deserts could have also been measured or proven as supporting evidence to the literature. However, these regressions would have been cumbersome and possibly a thesis topic in and of themselves.

The concept of incorporating urban agriculture into this thesis was derived from my own personal perception of what contributions would be beneficial to the community. There is a significant amount of literature on the positive effects urban agriculture can have on a community, and now, researchers are trying to standardize a method for measuring its impact. This thesis and future research need to attempt to further understand and measure the quantitative impacts of urban agriculture. Results of this type of study may find that integration is more effective in smaller towns, rather small communities within larger cities.
APPENDIX A
ASSESSMENT OF UA REDEVELOPMENT PLANS

Table A-1. Assessment of UA (Urban Agriculture) Redevelopment Plans. An evaluation table used to conduct the comparative, cross-case analysis of the three case studies and Cabot Koppers.

<table>
<thead>
<tr>
<th>Local Demographics</th>
<th>Windy City Harvest</th>
<th>Lynchburg Grows</th>
<th>Liberty Lands</th>
<th>Cabot Koppers</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>North Lawndale, Chicago</td>
<td>Lynchburg</td>
<td>Philadelphia</td>
<td>Gainesville</td>
</tr>
<tr>
<td>Census Tract</td>
<td>17031841400</td>
<td>51680000700</td>
<td>42101014200</td>
<td>12001000302</td>
</tr>
<tr>
<td>Tract Population</td>
<td>1,228</td>
<td>3,622</td>
<td>3,923</td>
<td>2,426</td>
</tr>
<tr>
<td>(2016)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tract Land Area</td>
<td>0.094</td>
<td>1.36</td>
<td>0.304</td>
<td>1.465</td>
</tr>
<tr>
<td>(Sq. Miles)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tract Density per</td>
<td>13,064</td>
<td>2,663</td>
<td>12,905</td>
<td>1,656</td>
</tr>
<tr>
<td>Sq. Mile</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median Household</td>
<td>$25,694</td>
<td>$27,316</td>
<td>$85,765</td>
<td>$25,119</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td>399</td>
<td>1,393</td>
<td>2,026</td>
<td>1,156</td>
</tr>
<tr>
<td>SNAP Households</td>
<td>39.60%</td>
<td>31.90%</td>
<td>2.60%</td>
<td>24.80%</td>
</tr>
<tr>
<td>Food Insecurity Rate</td>
<td>12.4% - 14.1%</td>
<td>&gt;16.6%</td>
<td>&gt;16.6%</td>
<td>&gt;16.6%</td>
</tr>
<tr>
<td>Percentage of people below poverty</td>
<td>43.3%</td>
<td>41.9%</td>
<td>4.1%</td>
<td>26.3%</td>
</tr>
<tr>
<td>Unemployment Rate</td>
<td>18.7%</td>
<td>7.8%</td>
<td>1.5%</td>
<td>20.1%</td>
</tr>
<tr>
<td>Health Insurance</td>
<td>85.2%</td>
<td>78.4%</td>
<td>91.6%</td>
<td>80.2%</td>
</tr>
<tr>
<td>Local Demographics</td>
<td>Windy City Harvest</td>
<td>Lynchburg Grows</td>
<td>Liberty Lands</td>
<td>Cabot Koppers</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------</td>
<td>-----------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Adult Obesity Rate</td>
<td>25.3%</td>
<td>27.1%</td>
<td>29.8%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Walks to Work</td>
<td>8.8%</td>
<td>10.3%</td>
<td>6.3%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Minority Population</td>
<td>91.6%</td>
<td>65.3%</td>
<td>29.6%</td>
<td>31.0%</td>
</tr>
<tr>
<td>2015 Low-Income</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2015 Low-Access</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2010 Low-Income</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2010 Low-Access</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Local Legislation</td>
<td>Windy City Harvest</td>
<td>Lynchburg Grows</td>
<td>Liberty Lands</td>
<td>Cabot Koppers</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Comprehensive Plans / Goals</td>
<td><em>GO TO 2040: Chicago’s Comprehensive Plans</em> - Promote local sustainable foods within their <em>Livable Communities</em> section</td>
<td><em>City of Lynchburg’s Comprehensive Plan 2013-2030</em> - Promote a culture of lifelong learning and healthy/active living within their <em>Education and Community Health</em> section</td>
<td><em>2035 Citywide Vision: Philadelphia’s Comprehensive Plan</em> - Promote a strong and well-balanced neighborhood centers within their <em>Neighborhoods</em> section</td>
<td><em>Alachua County Comprehensive Plan 2011-2030</em>: Promote local, sustainable food production and identify opportunities in multiple sections of their comprehensive plan including their: Future Land Use Element, Economic Element, Community Health Element, Energy Element. <em>Business and Economic Growth Plan 2015 from the Gainesville Area Chamber of Commerce</em>: Identify a need to grow and promote the local food economy</td>
</tr>
<tr>
<td>Task Forces / Platform Strategies</td>
<td><em>A Recipe for Healthy Places and Green Healthy Neighborhoods</em></td>
<td><em>Live Healthy Lynchburg</em></td>
<td><em>DVRPC’s Healthy Communities, Get Healthy Philly, and Philly Food Bucks Program</em></td>
<td>Unknown</td>
</tr>
<tr>
<td>Local Legislation</td>
<td>Windy City Harvest</td>
<td>Lynchburg Grows</td>
<td>Liberty Lands</td>
<td>Cabot Koppers</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------</td>
<td>----------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Zoning / Ordinances</td>
<td><em>Urban Agriculture Zoning Code Amendment (2011)</em> - Allows community gardens within nearly all zoning districts except manufacturing and some planned developments. Urban farms are restricted from residents and some business districts but permitted in districts where community gardens have been restricted. More restrictive for outside operations. Also, includes 1.) expanded the allowable size limit to 25,000 square feet 2.) Relaxed fencing and parking requirements to hold down overhead costs 3.) Allowed for hydroponic and aquaponic systems and keeping honey bees under set conditions 4.) Created green jobs and provided fresh produce in communities.</td>
<td><em>Zoning Ordinance (2016)</em> - Permits vegetable farming and crop production in all zones except one (of four) business district and three (of three) restricted industrial districts. Greenhouse production is permitted on the majority of zoning districts, but the sale of products grown is limited to roughly half of the business, industrial, and restricted industrial. Sales of products grown on residential districts is not permitted.</td>
<td><em>Zoning Code (2011)</em> - Fresh food markets are 1.) allowed to exceed 50% of lot area where there are area limits 2.) maximum 25,000 sq. ft. 3.) may exceed building height by 15ft 4.) exempt from parking requirements for first 10,000 sq. ft. Urban Agriculture is now a standalone use category and 1.) permitted to sell goods on the same lot as the UA use in locations where retail stores are allowed 2.) must be designed to contain drainage 3.) have barrier fencing or dense vegetation 4.) have rodent-resistant compost bins 5.) have enclosed storage 6.) have work curfews.</td>
<td><em>Alachua County Comprehensive Plans (2011)</em> - FLU 6.1.5: Agricultural pursuits shall be allowed in all land use classifications provided that the health, safety and welfare of the general public and the natural environment are assured. <em>Gainesville Article V Use Standards Section 30-5.11 Farmers Markets</em>: annual permits for farmers markets on public or private property for up to four days per week. Compliance with sound. Temporary sign no wider than the tents. Operator must provide a bond for cleanup based on square footage. <em>Gainesville Article IV Zoning</em>: Farmers' markets permitted in U6-U9, DT, AGR, PS (Public Service) zones.</td>
</tr>
</tbody>
</table>
Table A-1. Continued

<table>
<thead>
<tr>
<th>Local Legislation</th>
<th>Windy City Harvest</th>
<th>Lynchburg Grows</th>
<th>Liberty Lands</th>
<th>Cabot Koppers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Funding/Incentives Available</td>
<td>Enterprise, Tax Increment Financing (TIF), and Industrial Corridor Zones - funding, receive tax breaks, special ordinance and regulation exemptions. Qualified Investment Areas financially supported by the Neighborhoods Opportunity Fund to help with land acquisition, rehabilitation, demolition, planning and design, recruiting and hiring, business incubation, mentoring, and training</td>
<td>Enterprise, Revitalization, Technology, Tourism, Arts &amp; Culture, and Industrial Park Zones - funding, tax breaks, special ordinance and regulation exemptions.</td>
<td>Empowerment Zones, Community Development Corporation Support and Revitalizing Corridors - grants/funding, reimbursements, tax credits, tax preparation, financial literacy. Neighborhood Funding Stream - funding for tax preparation, financial literacy, workforce development, job training, commercial and industrial real estate development, business expansion, business technical assistance, and commercial corridor revitalization.</td>
<td>Enterprise Zones, Enterprise Retention Program, GRU Economic Development Rate, Qualified Target Industry Program, Industrial Revenue Bonds, and Community Redevelopment Agency - reduced development fees, retention of enterprise zone savings when relocating, discounted rate for energy, tax refunds, bonds for property acquisition, construction, machinery, and equipment costs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Redevelopment Conditions</th>
<th>Windy City Harvest</th>
<th>Lynchburg Grows</th>
<th>Liberty Lands</th>
<th>Cabot Koppers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>2005</td>
<td>2006</td>
<td>1994</td>
<td>2020</td>
</tr>
<tr>
<td>Size</td>
<td>0.25-acre</td>
<td>6.79-acre</td>
<td>2.04-acre</td>
<td>140-acre</td>
</tr>
<tr>
<td>Land Use</td>
<td>Commercial</td>
<td>Industrial</td>
<td>Recreation</td>
<td>Industrial, Mixed-Use, Commercial</td>
</tr>
<tr>
<td>Redevelopment Conditions</td>
<td>Windy City Harvest</td>
<td>Lynchburg Grows</td>
<td>Liberty Lands</td>
<td>Cabot Koppers</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------</td>
<td>----------------</td>
<td>--------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Zoning</td>
<td>C1-2: Neighborhood Commercial District</td>
<td>I-3: Heavy Industrial</td>
<td>SP-PO-A: Special Purpose - Parks and Open Space - Active</td>
<td>I-2, I-1, MU-2, BA: Industrial, mixed-use, automotive-oriented business</td>
</tr>
<tr>
<td>Enterprise/Empowerment Zone</td>
<td>Yes</td>
<td>Available but not located in zone</td>
<td>Available but not located in zone</td>
<td>Available but not located in zone</td>
</tr>
<tr>
<td>Other Special Zones</td>
<td>Ogden/Pulaski TIF</td>
<td>Revitalization Zone</td>
<td>Philadelphia Health Enterprise Zone</td>
<td>None</td>
</tr>
<tr>
<td>Previous Operations on Land</td>
<td>Dry cleaning facility</td>
<td>Greenhouse facility</td>
<td>Leather tannery</td>
<td>Wood treating</td>
</tr>
<tr>
<td>Contamination</td>
<td>Cleaning chemicals</td>
<td>Lead paint</td>
<td>Chlorine based chemicals</td>
<td>Creosote, pentachlorophenol, copper-chromium-arsenic, and pine tar</td>
</tr>
<tr>
<td>Access to Land</td>
<td>Urban land trust supplied</td>
<td>Special interest sale</td>
<td>Donation</td>
<td>TBD</td>
</tr>
<tr>
<td>Access to Water</td>
<td>Urban land trust supplied</td>
<td>Unknown</td>
<td>Unknown</td>
<td>TBD</td>
</tr>
<tr>
<td>Access to Capital</td>
<td>Urban land trust supplied</td>
<td>Existing structures, grants</td>
<td>Grants</td>
<td>TBD</td>
</tr>
<tr>
<td>Organization/Developer(s)</td>
<td>The Chicago Botanic Garden, Windy City Harvest Initiative</td>
<td>Lynchburg Grows</td>
<td>Northern Liberties Neighbors Association</td>
<td>Beazer East</td>
</tr>
<tr>
<td>Support Partners</td>
<td>NeighborSpace, Lawndale Community Church, and more</td>
<td>St. John's Episcopal Church, local government agencies and schools, and more</td>
<td>Girard Medical Center</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Table A-1. Continued

<table>
<thead>
<tr>
<th>Redevelopment Conditions</th>
<th>Windy City Harvest</th>
<th>Lynchburg Grows</th>
<th>Liberty Lands</th>
<th>Cabot Koppers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Type</td>
<td>Non-Profit 501 (c)</td>
<td>Non-Profit 501 (c)</td>
<td>Non-Profit 501 (c)</td>
<td>For-profit environmental cleanup consultants</td>
</tr>
<tr>
<td>Business Description</td>
<td>Urban farm</td>
<td>Urban farm / community garden</td>
<td>Community garden with various other activities like a park, playground, picnic area, outdoor movie area, and butterfly garden</td>
<td>TBD</td>
</tr>
<tr>
<td>Redevelopment Goals</td>
<td>Provide human/youth development, education, and employment for low-income communities. Advance social emotional learning and sustainable urban agriculture</td>
<td>Provide access to healthy foods and afford purposeful jobs to individuals with disabilities</td>
<td>Promote greenspace redevelopment and provide healthy, fresh food options</td>
<td>TBD</td>
</tr>
<tr>
<td>Redevelopment Operations</td>
<td>Windy City Harvest</td>
<td>Lynchburg Grows</td>
<td>Liberty Lands</td>
<td>Cabot Koppers</td>
</tr>
<tr>
<td>Growing Method(s)</td>
<td>Raised beds</td>
<td>Greenhouses with raised beds</td>
<td>Conventional</td>
<td>TBD</td>
</tr>
<tr>
<td>Growing Area Lot Size</td>
<td>2,000 square feet (20% of lot)</td>
<td>70,000 square feet (25% of lot)</td>
<td>14,000 square feet (16% of lot)</td>
<td>TBD</td>
</tr>
<tr>
<td>Crops</td>
<td>Various produce</td>
<td>Various produce and spreads</td>
<td>Various produce</td>
<td>TBD</td>
</tr>
<tr>
<td>Mediums</td>
<td>Soil</td>
<td>Compost Soil</td>
<td>Compost Soil</td>
<td>TBD</td>
</tr>
<tr>
<td>Water</td>
<td>Surface</td>
<td>Drip irrigation</td>
<td>Surface</td>
<td>TBD</td>
</tr>
<tr>
<td>Redevelopment Operations</td>
<td>Windy City Harvest</td>
<td>Lynchburg Grows</td>
<td>Liberty Lands</td>
<td>Cabot Koppers</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------</td>
<td>----------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Structures</td>
<td>27 raised beds, 1 shed</td>
<td>9 greenhouses, 1 building for operations and storage, 1 tiny house for on-site help housing</td>
<td>30 plots, multiple storage sheds, bathroom facilities, playground, picnic area</td>
<td>TBD</td>
</tr>
<tr>
<td>Value-added Processes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>TBD</td>
</tr>
<tr>
<td>Annual Output</td>
<td>100,000 lbs. (12 locations on 8 acres) in 2016</td>
<td>23,924 lbs. (59,810 servings) in 2017</td>
<td>Unknown</td>
<td>TBD</td>
</tr>
<tr>
<td>Farm Stand / Market</td>
<td>Multiple local farm stand locations including on site, standalones, at local cafés and community centers</td>
<td>On-site market sales and delivery services</td>
<td>On-site</td>
<td>TBD</td>
</tr>
<tr>
<td>Jobs</td>
<td>Employs 20 youth part-time farmers</td>
<td>Employs 8 part-time farmers</td>
<td>None, only members and unpaid board of directors</td>
<td>TBD</td>
</tr>
<tr>
<td>Programs</td>
<td><em>Youth Farm Program</em>, employment, leadership development, healthy lifestyle education, community service, social entrepreneurship, urban farming practices, crop sales and donations.</td>
<td>Employment, physical and mental disabilities job opportunities, internships, vocational training, &quot;Veggie Box&quot; for members, &quot;Veggie Van&quot; deliveries to food deserts, FreshRx for diet-related illnesses, community engagement, designated garden for donations, community compost, annual events</td>
<td>Community member gardening, farmers market, recreation within park, picnic and playground areas, scheduled public and private events</td>
<td>TBD</td>
</tr>
</tbody>
</table>
Table A-1. Continued

<table>
<thead>
<tr>
<th>Redevelopment Operations</th>
<th>Windy City Harvest</th>
<th>Lynchburg Grows</th>
<th>Liberty Lands</th>
<th>Cabot Koppers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue (2017)</td>
<td>$39.8 million (all sites)</td>
<td>$254,464 (2016)</td>
<td>$298,906</td>
<td>TBD</td>
</tr>
<tr>
<td>Expenses (2017)</td>
<td>$39 million (all sites)</td>
<td>$227,612 (2016)</td>
<td>$264,057</td>
<td>TBD</td>
</tr>
<tr>
<td>Funding</td>
<td>Volunteers, bequests and trusts, planned gifts, matching gifts, government and institution funding/donations, individual donations, endowed funding, fundraising campaigns, and earned income (all sites)</td>
<td>Volunteers, memberships, foundations and trusts, corporate and business, private support, government and institution funding/donations, partnerships, and earned income</td>
<td>Volunteers, memberships, grants, matching gifts, private support, individual donations, fundraising events</td>
<td>TBD</td>
</tr>
<tr>
<td>Other</td>
<td>Compost is collected from local schools and colleges, wood chips and tree trimmings from city collection ($96k in public savings)</td>
<td></td>
<td>Biosolids, solid materials generated from waste water treatment, were used as fertilizer and topsoil.</td>
<td>TBD</td>
</tr>
</tbody>
</table>

Note. Data for Assessment of UA Redevelopment Plans are from a variety of locations and have been indicated by section: local overview (US Census Bureau, n.d.; USDA, 2017; USDA, 2017); local legislation (Alachua County, 2017; CMAP, 2014; City of Chicago, 2018; City of Gainesville, 2017; City of Gainesville, 2017; City of Gainesville, 2018; City of Lynchburg, 2016; City of Lynchburg, 2014; City of Philadelphia, 2011; City of Philadelphia, 2018); redevelopment conditions (US EPA, 2010; Lynchburg Grow, 2018; Chicago Botanic Garden, 2016; NLNA, 2012; Alachua County, n.d.; City of Chicago, n.d.; City of Philadelphia, n.d.; City of Lynchburg, n.d.); redevelopment operations (Google, n.d.; Chicago Botanic Garden, 2016; Chicago Botanic Garden, 2018; Lynchburg Grows, 2018; NLNA, 2012; NLNA, 2018).
Table B-1. CityAg Projected Financials. The financial numbers indicated in this table are projections based on the annual averages for various financial categories reported by Lynchburg Grows, from 2012 through 2016. The averages from Lynchburg Grows are then extrapolated out for CityAg’s projections relative to the difference in their farming size.

<table>
<thead>
<tr>
<th></th>
<th>Lynchburg Grows</th>
<th>CityAg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Gross receipts</td>
<td>$330,854</td>
<td>-</td>
</tr>
<tr>
<td>Employees</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>Volunteers</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Grant contributions</td>
<td>$256,240</td>
<td>-</td>
</tr>
<tr>
<td>Investment income</td>
<td>$150</td>
<td>-</td>
</tr>
<tr>
<td>Program service revenue</td>
<td>$74,442</td>
<td>-</td>
</tr>
<tr>
<td>Partnerships</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Net rental income</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Warehouse rent</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>reimbursement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net income from</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>fundraising events</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other revenue</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total revenue</strong></td>
<td><strong>$330,832</strong></td>
<td>-</td>
</tr>
<tr>
<td>Grants paid</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Benefits paid</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Salaries</td>
<td>$71,663</td>
<td>-</td>
</tr>
<tr>
<td>Employee benefits</td>
<td>$1,292</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Lynchburg Grows</td>
<td>CityAg</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>Payroll taxes</td>
<td>$5,482</td>
<td>-</td>
</tr>
<tr>
<td>Advertising and promotion</td>
<td>-</td>
<td>$0</td>
</tr>
<tr>
<td>Professional fundraising fees</td>
<td>-</td>
<td>$0</td>
</tr>
<tr>
<td>Occupancy</td>
<td>$26,130</td>
<td>-</td>
</tr>
<tr>
<td>Office expenses</td>
<td>-</td>
<td>$0</td>
</tr>
<tr>
<td>Travel</td>
<td>$4,091</td>
<td>-</td>
</tr>
<tr>
<td>Conferences, conventions</td>
<td>$980</td>
<td>-</td>
</tr>
<tr>
<td>Interest</td>
<td>$7,856</td>
<td>-</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$15,462</td>
<td>-</td>
</tr>
<tr>
<td>Greenhouse supplies</td>
<td>$11,848</td>
<td>-</td>
</tr>
<tr>
<td>Farmers’ market supplies</td>
<td>$38,457</td>
<td>-</td>
</tr>
<tr>
<td>Insurance</td>
<td>$10,732</td>
<td>-</td>
</tr>
<tr>
<td>Warehouse lease</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Outside services</td>
<td>$32,723</td>
<td>-</td>
</tr>
<tr>
<td>Sundry other</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Sales tax</td>
<td>$0</td>
<td>-</td>
</tr>
<tr>
<td>Other expenses</td>
<td>$22,036</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td><strong>$248,752</strong></td>
<td>-</td>
</tr>
<tr>
<td>Revenue less expenses</td>
<td><strong>$82,080</strong></td>
<td>-</td>
</tr>
</tbody>
</table>
LIST OF REFERENCES


http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180AB551


https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=FLORIDA


https://ir.lawnet.fordham.edu/cgi/viewcontent.cgi?article=2423&context=ilj

BIOGRAPHICAL SKETCH

John Goeman is the son of John Goeman and Donna Montplasir who was born and raised in the small city of Manchester, New Hampshire. John earned his Bachelor of Science degree in construction management at East Carolina University in North Carolina. He was drawn to the urban planning field by his interest in the functions and relationships among communities and within the built environment. He has graduated from the University of Florida where he has earned his Master of Urban and Regional Planning with minor in entrepreneurship. John plans to continue exploring community redevelopment and social entrepreneurship with hopes of becoming a professional community planner or entrepreneur.