Economic Viability of Urban Agriculture in Boston, Massachusetts

May 2015

Urban Agriculture in Boston and its Economic Viability

AUTHORS

This analysis was developed by Rachel Corey, Kelly Riley, Marie-Frances Rivera, and Daniel Sullivan, graduate students in Northeastern University's School of Public Policy and Urban Affairs on behalf of the Trust for Public Land.

ACKNOWLEDGEMENTS

The authors would like to thank several key stakeholders, partners and advisors who supported the development of this research.

Kevin Essington, Trust for Public Land, Client

Christopher Bosso, PhD, Northeastern University, Faculty Advisor

Alicia Sasser-Modestino PhD, Northeastern University, Faculty Advisor

Bobby Walker, Nataka Crayton, Sedric White, Urban Farming Institute

Jennifer Rushlow and Elena Mihaly, Conservation Law Foundation

Mara Gittleman, Kingsborough Community College

Mansfield Frazier, Chateau Hough

Marcia Caton Campbell, PhD, Center for Resilient Cities

Harry Smith, Dudley Street Neighborhood Initiative

Glynn Lloyd, formerly with City Growers, LLC

James Smith, Department of Neighborhood Development

Jonathan Larkin, NUBIA

3rd Annual Massachusetts Urban Farming Conference

Boston Urban Ag Steering Committee

PHOTO CREDIT

La Citta Vita © Farmers Market, display via Creative Commons Attribution License 2.0
https://www.flickr.com/photos/la-citta-vita/6262194275/

Northeastern University

THE TRUST for PUBLIC LAND
CONSERVING LAND FOR PEOPLE

Table of Contents

Executive Summary **3**
- Research Conducted 3
- Pathways to Profitability 3
- Measuring the Impacts of Urban Agriculture 3
- Policies, Laws, and Incentives 4

Boston's Urban Agriculture Sector and Stakeholders **5**

Research, Data, & Methodology **8**

Pathways to Profitability **9**
- Legal Structures & Business Planning Resources 9
- Deciding on a Legal Business Structure 9
- Raising Start-up Capital 17
- Crop Selection and Techniques 21
- Distribution 26
- References 27

Economic & Community Impacts **28**
- Evaluation Metrics 30
- Farm Operator Data Collection Instrument 34
- Community Member Survey 36
- References 39

Policies, Laws, and Incentives **40**
- Current Context 40
- Comprehensive Plan 42
- Access to Capital 44
- Tax Incentives 45
- Community Building 47
- References 49

Key Findings and Recommendations **51**
- Pathways to Profitability 51
- Economic & Community Impacts 51
- Policies, Laws, and Incentives 52

Appendix 1 ..... **54**

Appendix 2 ..... **56**

References **61**

Executive Summary

This paper investigates the economic viability of urban farming in Boston, and ways in which the industry can be supported to leverage vacant lands. Our client, Trust for Public Land (TPL) works to conserve green space where people can experience nature close at hand. In the City of Boston, its mission has taken shape through urban farming and other cultural projects.

TPL is working to strengthen Boston's nascent urban agriculture sector, which received momentum in December 2013 with the passage of a citywide "right-to-farm" zoning ordinance, Article 89, that allows commercial urban agricultural enterprises to exist in the city. TPL is supporting municipal endeavors to create a resilient city through the lens of urban agriculture by transforming available public land into farmable plots that will then be transferred or sold for future farms.

TPL's objective, and the focus of this research, is to ensure these enterprises succeed. Through its work, TPL has observed that *urban farms are overly reliant on philanthropic and public funds for short and long-term sustainability.* This dependence raises concerns about the stability and profitability of individual farm enterprises and the sector overall. As such, this study assesses the current state of urban agriculture and offers recommendations to enable its economic viability.

Research Conducted

To address the current state and future of urban agriculture (urban ag), three research questions were explored:

- What **organizational and business models** would allow for sustainable urban farming?
- How can we demonstrate and monetize the **economic and food access impacts** of urban farms to the City of Boston and other stakeholders?
- What is the role of **local, state, and national policies, laws, and incentives** to reach these goals?

Our capstone team conducted this research via a literature review, informal interviews, and participation in citywide planning meetings.

Pathways to Profitability

This set of recommendations allow for the creation and ongoing operation of financially stable and thriving urban agricultural enterprises.

> ***Recommendation:*** *During the start-up phase, local urban farmers must select the best legal structure for their urban agricultural enterprise, mitigate start-up costs, and ensure land security. In addition, they must select high profit yielding, ground-level crops suited to our geographic location to achieve financial sustainability.*

Measuring the Impacts of Urban Agriculture

More Boston-area stakeholders are likely to support urban agriculture if its positive outputs and outcomes can be quantified. At present, however, there is limited research available that quantifies the impacts of urban farming on the city. The current vision of Boston's urban ag community is to have all

urban farming operations utilize identical metrics to measure outcomes and economic benefits. Doing so will allow information to be aggregated and demonstrate clearer impacts.

In order to effectively measure the broad range of impacts from urban farming operations, three surveys are needed: a survey and data collection tool for farm operators, a survey instrument for customers and community members, and a set of metrics for independent evaluation (for data which a farm operator cannot be expected to collect). Each of these tools has been modeled herein to provide a context for moving forward with the implementation of a data collection strategy.

> ***Recommendation**: TPL and/or the City should revise and implement a set of data collection tools for urban farm sites to monitor effects and impacts on the community.*

Policies, Laws, and Incentives

Much time, energy, and financial support is being lent to urban farming through government programs, private philanthropy, and academic research. A strategic plan that aligns both public and private commitments should be formalized.

> ***Recommendation for client action**: Support and advocate for proven models, such as the Community Land Trust model, that champions TPL's mission and shares a dual objective with Boston-based stakeholders in the smart growth, economic development, and housing conversations.*

> ***Recommendation for municipal action**: Establish a formal urban agriculture policy; this should be supported by an urban agriculture land use plan, resource database, tax incentives, education, and a single organizational contact for urban agriculture matters.*

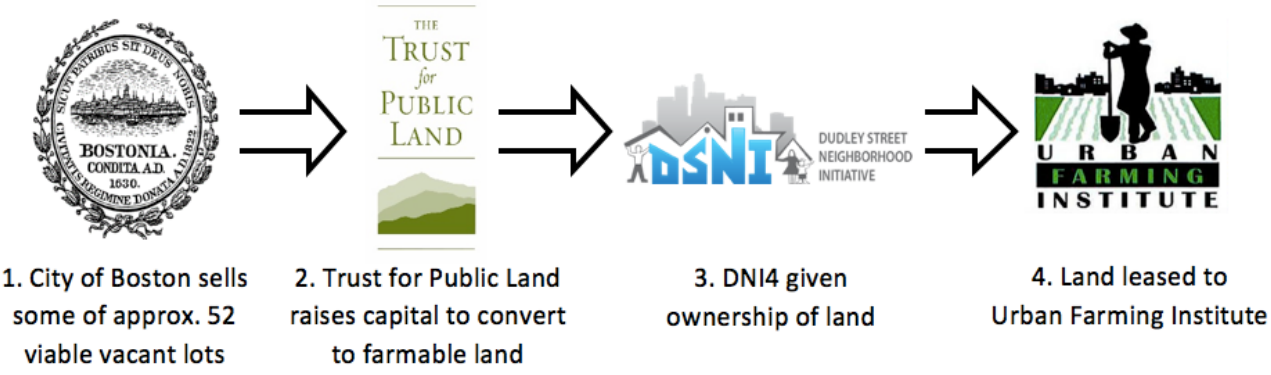
Several parameters guided our research and recommendations:

1. **The client, TPL, is a mission-driven organization focused on 'greening the city' and is seeking an assessment of the sustainability of ground level farms in the City of Boston. As a result, rooftop, freight farming and soil-free technologies are not explored.**
2. **Due to the prohibitive cost of private land in the city of Boston, our study will focus on available public land.**
3. **The scope of the research is restricted to agricultural production in the city, therefore strategies for improving food systems more broadly are not explored.**

Boston's Urban Agriculture Sector and Stakeholders

A 2013 survey found there were approximately 2,600 vacant public lots owned by the City of Boston (Chin, 2013). The majority of these lots, which are suitable for housing and/or urban farming activities, are managed by either the Department of Neighborhood Development (DND) or the Boston Redevelopment Authority (BRA). The Trust for Public Land is committed to securing 12 suitable parcels of approximately 1/4 acre each, or about 3 acres in total, for urban farming projects. In exchange for the land, TPL must raise substantial capital with which to convert the properties to arable farmland. Figure 1, below, is the land transfer process and model that TPL and partners are utilizing to acquire and lease land for urban agriculture projects.

Figure 1:



The Trust for Public Land

The mission of the Trust for Public Land (TPL) is to create parks and protect land for people, ensuring healthy, livable communities for generations to come (The Trust for Public Land, 2015). Agriculture is one of the means through which nature can be brought back into the city. TPL recognizes that urban agriculture offers numerous benefits to society. And, their goal of *'greening the city'* intersects with the shared interests of numerous stakeholders who support urban ag through the lens of; food access, health, the environment, education, and supporting socio-cultural communities (Essington K., Executive Director, The Trust for Public Land, 2015).

Dudley Square Neighborhood Initiative

Dudley Square Neighborhood Initiative (DSNI) is a nonprofit community-based organizing and planning organization that focuses on the Roxbury/North Dorchester neighborhood of Boston. Started in 1984, it added a community land trust to its organization in 1988, Dudley Neighbors, Inc. (DNI). In addition, DSNI has created another community land trust subsidiary to hold its urban agriculture land: DNI4 (Smith, 2015). DNI4 currently holds the Food Project's one and a half acre West Cottage farm site and will hold the Trust for Public Land's Garrison-Trotter farm once TPL completes the process of turning it into farmable land. DSNI/DNI4 and TPL have a donation agreement to transition the land from the ownership of TPL to DNI4 for one dollar (Smith, 2015). DSNI is firm in its commitment that it does not want to

maintain or run urban farms in Boston. Thus, the TPL partnership is ideal for DSNI since it will only inherit farms that are already operational. DSNI has begun providing fee-based technical assistance for those interested in setting up their own community land trusts in the Greater Boston area (Smith, 2015). DSNI is most interested in preserving land as the community members want it, and currently many are calling for urban agriculture.

Urban Farming Institute

The Urban Farming Institute's (UFI) mission is to contribute to healthy people and sustainable cities by promoting and creating self-sustaining urban farming enterprises and farming jobs. By enabling urban farming through farm creation, farmer training, public education, and policy change; UFI brings people in urban neighborhoods closer to food production.

Over the last two summer growing seasons, the Institute has trained 18 farmers who are looking for farms to work (Loh, 2015). TPL is working in partnership with UFI to lease farmable land to UFI graduates once the land is transferred to community land trusts.

City Growers, LLC

City Growers' mission is to transform vacant lots in Boston into intensive urban farms that are economically and environmentally sustainable and is another community stakeholder with whom TPL is actively engaged. City Growers seeks to maximize community participation to access land opportunities; prepare the land and "train growers to cultivate (the land) using carbon free practices" (Growers, 2015).

In addition, Figure 2, on the following page provides an overview of relevant stakeholders and categories, please note this is not an exhaustive list.

Figure 2:

Boston-area Urban Agriculture Stakeholders

1) Urban Farmers and Gardeners

City Growers, LLC
The Urban Farming Institute
The Food Project
Higher Ground Farm
Green City Growers
ReVision Urban Farm
NUBIA

2) Future Urban Farmers and Gardeners

3) Support Organizations

Massachusetts Farm Bureau Association
Boston-area Academic Institutions:
Northeastern University
Tufts University
Harvard University
Crop Circle Kitchen
Greenovate Boston
Boston Collaborative for Food and Fitness
Boston Food Forest Coalition
Codman Square NDC
Dudley Street Neighborhood Initiative
Boston Natural Area's Network
Conservation Law Foundation
Boston Urban Ag Visioning and Steering Comm.

4) Funders (non-gov't)

Trust for Public Land
Merck Family Foundation
The Carrot Project
Kendall Foundation
The Boston Foundation
Trustees of Reservations

5) Public Sector

Federal:
United States Department of Agriculture (USDA)
Department of Housing and Urban Development (HUD)
Environmental Protection Agency (EPA)

State:
Massachusetts Department of Agricultural Resources
Massachusetts Food Policy Council Advisors
Massachusetts Food Policy Alliance
State Legislature and Executive branches

Local:
Mayor Marty Walsh
Mayor's Office of Food Initiatives
Boston Public Health Commission
Boston Redevelopment Authority
Department of Neighborhood Development
City Council

6) Boston Neighborhoods & Residents

Research, Data, & Methodology

In order to understand urban agriculture in the geographic context of the Boston area, our team researched urban ag businesses, policies, practices, and laws in Boston and around the country. An extensive literature review was conducted to gather data on promising commercial urban agricultural efforts that could be applied to our local context. Data were collected from scholarly journals and publications, reports by cities, towns and urban farming organizations, journals such as the *Journal of Agriculture, Food Systems, and Community Development,* and other relevant sources.

The case studies referenced throughout this report were compiled from interviews with both local and national stakeholders. In addition, our team's attendance at local urban agriculture meetings and conferences was vital in capturing information that was utilized to enhance our findings. In particular, the Boston Urban Ag Visioning process, a forum in which local stakeholders are engaged in a comprehensive review of the urban agriculture efforts in the City, helped ground our research. The process has taken place throughout the course of our research and has allowed us to connect with relevant stakeholders and understand the current gaps of knowledge in the local field. Additionally, the 3rd Annual Massachusetts Farming Conference convened on Saturday, March 28th, 2015, was extremely helpful in guiding our research. In addition, farm's confidential financial documents were collected through interviews and email correspondence.

Pathways to Profitability

There are a myriad of considerations a food entrepreneur must take into account before launching an urban agricultural enterprise. The scope of this study is focused on the financial and overall sustainability of urban farms in Boston over the short- and long-term. To explore this systematically, these findings will focus on three major categories that an entrepreneur must research and seek professional advice on before launching a business.

These categories are most closely linked with the major potential revenues and costs that an entrepreneur will encounter.

- **Deciding what legal business structure best suits your venture**
- **Start-up capital costs**
- **Operating costs, crop selection, and distribution**

Legal Structures & Business Planning Resources

For comprehensive guides on developing and launching an urban and/or rural agriculture business, see these guides:

> ***Building a Sustainable Business: A Guide to Developing a Business Plan for Farms and Rural Businesses:*** http://www.sare.org/Learning-Center/Books/Building-a-Sustainable-Business
>
> ***An Entrepreneur's Guide to Farming in Massachusetts: Fertile Resources, Harvestable Tips, and a Side-Dress of Regulatory Reality:*** http://nesfp.org/sites/default/files/resources/an_entrepreneurs_guide_to_farming_ma_0.pdf
>
> ***How to Begin your Small Farm Dream A Plain Language Guide from the New Entry Sustainable Farming Project:*** http://nesfp.nutrition.tufts.edu/sites/default/files/resources/how_to_begin_your_small_farm_dream.pdf

Deciding on a Legal Business Structure

One of the first steps toward establishing an urban agricultural enterprise is selecting a legal business structure. Choosing a legal entity is one of the most fundamental decisions an owner can make, and is typically made on a case-by-case basis. In Massachusetts, for-profit and nonprofit legal structures range from sole proprietorships to corporations to cooperatives. Traditionally, most farm businesses organize as sole proprietorships or partnerships, and while these continue to be the most common legal structures, a growing number of today's farms are incorporating as Limited Liability Corporations (LLCs), Cooperatives, and blended models.

As mentioned, the most widely utilized legal structure in Massachusetts is the sole proprietorship, with 79.5 percent of farms operating as sole proprietorships in the state (Food Law & Policy Clinic of Harvard Law School for Conservation Law Foundation, 2014). Since 2002, the total number of farms using corporations, LLCs, and other structures (cooperative, estate, or trust) increased, parallel to a decline in the number of farms organized as partnerships (Ibid.). Nonprofit legal entities are also used by urban

farming enterprises to fulfill social missions and aid with financial sustainability. These structures offer farmers differing levels of financial protection, tax advantages, and other benefits.

The main differences of note among these structures are:

1) Ease or difficulty of formation
2) Governance structure
3) Ability to fundraise
4) Ease of transfer
5) Risk and liability
6) Taxation
7) Life Cycle potential

NOTE: While this information is meant to inform those launching farms and other related businesses, we highly recommend seeking professional legal assistance when making this decision. In the Commonwealth, the Conservation Law Foundation (CLF) manages the Legal Services Food Hub to help farmers, food entrepreneurs, and related organizations access free legal assistance from qualified attorneys. They advise on issues such as land acquisition/transfer, estate issues, taxes, contracts, and corporate formation, among others. *http://www.legalservicesfoodhub.org/*

The information provided in the next several pages is adapted from:

How to Choose a Business Structure: A Decision Guide **by Wholesome Wave, Conservation Law Foundation, & CLF Ventures**

Farm & Food Law: A Guide for Lawyers in the Legal Services Food Hub Network **by Food Law & Policy Clinic of Harvard Law School for Conservation Law Foundation**

An Entrepreneur's Guide to Farming in Massachusetts **by New Entry Sustainable Farming Project.**

Sole Proprietorship

This is the simplest structure to form and most used by farms in Massachusetts and does not require any legal filings in order to establish the existence of the business. Therefore, many farmers chose this form by default or by choice to spend less time on administrative matters and more time running their farm operations. This structure allows for only one sole owner, who gets the benefit of full control of the business. However, with full control also comes full liability. In terms of taxation, the income from the business is filed on the individual tax filings of the owner – therefore the owner's and the businesses' income are considered the same (MA Department of Revenue, 2014). In the worst-case scenario, the owner could have all assets seized if the business goes into bankruptcy.

One major challenge facing sole proprietorships is fundraising. As the business is not a separate entity recognized by the state, it cannot take in loans – a loan to the business must be a loan to the owner. The credit worthiness and/or capital of the owner determines the capitalization of the business.

General Partnership

A general partnership is an agreement between two or more sole proprietors. In this structure, the partners combine money, labor, skills, and/or property, and expect to share both profits and losses (Mass. General Laws). This arrangement overcomes the challenge of a sole proprietorship as more than one person is responsible for the losses and liabilities. Still, it does come with its own set of challenges.

While not legally required, it is prudent for farmers entering into a partnership to draft and sign an agreement detailing:

1) each partner's ownership interest;
2) how profits and losses are shared;
3) any obligation to contribute additional capital;
4) how management and control is shared among the partners and how decisions are made;
5) the ability to incur debt and other liabilities for the partnership;
6) restrictions on transferring partnership interests;
7) how to accept new partners and how current partners can withdraw from the partnership; and,
8) how and under what circumstances the partnership will terminate.

In order for this to be an advantageous venture for all partners, a carefully crafted partnership agreement should be drafted and reviewed by a qualified attorney (Food Law & Policy Clinic of Harvard Law School for Conservation Law Foundation, 2014).

Limited (Liability) Partnership (LP or LLP)

While similar to a general partnership, this structure requires partners to file a certificate of formation with the state. In this arrangement at least one of the partners must be the "general partner" and as such controls the management and operation of the business. The general partner also assumes greatest liability. The other partner(s) would be "limited" and would enjoy limited liability, but would not be able to participate in management decisions. Similar to a general partnership, it is advised that partners draft a partnership agreement.

Limited Liability Corporation (LLC)

The Limited Liability Corporation (LLC) is a hybrid form that is similar to the corporate form, but has many of the flexibilities and advantages of a partnership. Like an LLP, the LLC has limited liability for partners and has the option of "pass through" taxation. Instead of partners, an LLC has members who must draft an operating agreement similar to the partnership agreement (explained in the General Partnership description). This agreement can assign which members have managerial roles in the corporation, whether non-owners can become managers, and who can vote on certain decisions and act on behalf of the LLC. LLCs are good for farmers forming a multi-farm CSA, because it allows multiple farmers to share in the farm management while limiting their liability. Farmers participating in higher risk

activities, like creating value-add products or agro-tourism, could benefit by forming a separate LLC for those activities.

It is of crucial importance to carefully craft the operating agreement with a qualified attorney who is knowledgeable about the tax complexities associated with this structure and who is able to advise on ways to minimize the personal liability of the members and managers.

Corporations

The corporate form is one of the most complex, because the corporation, not its shareholders, is legally responsible for the actions and debts it incurs. While it provides greater personal liability protection, the tax consequences are higher and can limit the managerial control of the founders and operators of the farm. This can be a structure that works for some, and there are several corporations (B, S, C corps) that each offers their own sets of benefits that farmers should explore.

Nonprofit

A nonprofit corporation must be driven by and adhere to its stated social mission. In order for an organization to operate as a nonprofit and receive the tax benefits associated with this structure, it must submit organizational documents, such the Articles of Incorporation. This is a process that in Massachusetts costs about $850 and can take several months. There are ways to operate while an organization is in this holding pattern; for example, the farm could come to an agreement with a certified nonprofit that would become its fiscal sponsor and hold the organization's funds while it awaits certification. Only farmers who are not looking to generate profits for investors, partners, or shareholders and want to strictly adhere to a social mission should pursue this structure. Another positive of the nonprofit is that charitable foundations and individuals may be more willing to offer funding because they would receive tax deduction on their donations.

Of note, a for-profit urban farm can lease land from a nonprofit entity, this will be elaborated upon in other sections of the report and is the model that TPL, DNI4, and the Urban Farming Institute have established.

Low-Profit Limited Liability Company (L3C)

L3Cs are a new legal form that combines aspects of a non-profit and an LLC. One of the major reasons for the creation of L3Cs is to help socially minded organizations raise funds from charitable foundation through the form of a Program Related Investment (PRI). This is a loan or investment with rates and conditions that are much more favorable than market-rate loans and financing.

Massachusetts does not have the entity type L3C. A Foreign L3C would register with the Massachusetts Secretary's Office as a Foreign LLC (Rayburn, 2013).

Cooperative

This structure works to benefit its members, essentially it is a democratically run organization in which the individuals who partake in the business also reap the benefits. The way the cooperative is structured can vary widely, one type is an agricultural co-op where several farmers join together and each farmer is a member-owner of the larger entity. Co-ops can take on any of the legal entities discussed above.

Parent/Subsidiary

A structure in which a non-profit is paired with a for-profit can be beneficial, yet tricky. One could start a nonprofit parent and have its subsidiary be a for-profit or vice versa. Liability risk and the concern of losing the nonprofit status is a very relevant concern, this is a complicated structure to put in place, but for individuals with a deep knowledge of the nonprofit sector and the for-profit sector, this is an important structure to explore.

Use the chart on the following page to direct you toward to best structure for your urban farm. See Figure 3 on pages 15 & 16 for a synopsis of the pros and cons of each of these entities

What Legal Structure is best for my urban farm?

Use this chart to help you determine what the legal structure(s) would help your urban farm thrive.

Would you prefer a business that is easy to form?
Do the founder(s) want significant control of business decisions and management?

- Yes → Sole Proprietorship, General Partnership, Limited Partnership
- No → Corporation, LLC, Nonprofit, Cooperative, Blended Model**

Are one (or more of your partners) comfortable with less direct control, thus ultimately less liability?

- Yes → Corporation, LLC, Nonprofit, Limited (Liability) Partnership, Cooperative*, Blended Model**
- No → Sole Proprietorship, General Partnership

Would you like greater opportunities to raise capital from a wider range of people and institutions?

- Yes → Corporation, LLC, Nonprofit, Cooperative, Blended Model**
- No → Sole Proprietorship, General Partnership, Limited Partnership

Will you be the sole entrepreneur of this business and be willing to assume all profits and losses?

- Yes → Sole Proprietorship
- No → Corporation, LLC, Nonprofit, Limited (Liability) Partnership, Cooperative*, Blended Model**

Would you prefer a structure with access to greater tax benefits?

- Yes → LLC, Nonprofit, Limited Partnership, General Partnership, Cooperative*
- No → Sole Proprietorship, C Corporation

This information was adapted from *How to Choose a Business Structure: A Decision Guide* by Wholesome Wave, Conservation Law Foundation, & CLF Ventures, October 2014

*Depends on the structure and how contract is drafted.
**A nonprofit/for profit in a parent/subsidiary relationship

Figure 3:

Legal Structures - Pros and Cons				
Type	**% of farms in MA**	**PROS**	**CONS**	**Examples**
Sole Proprietorship	79.5%	▸ Easy to form no legal documents or filings required ▸ Sole owner has full control (full ownership, management, and liability)	▸ Sole owner assumes all losses and liability ▸ Potential challenges with raising capital ▸ Business income passes through the individuals' tax filings ▸ Can be difficult to transfer ownership	Leahey Farm (Lee, MA)
General Partnership	7.5%*	▸ Easy to form - no legal documents or filings required ▸ Business income passes through the individuals' tax filings ▸ There is no limit on the number of partners, therefore this allows for outside individuals to invest and share in the profits/losses of the farm	▸ Liability risks remain for all partners, all individuals exposed to potential losses ▸ This could deter outside investors ▸ Can be difficult to transfer your ownership interests to another individual ▸ Farmers may not want to use this structure, as investors would gain the right to influence their daily farm management	–
Limited Partnership	7.5 %*	▸ Investors can provide capital without incurring any liability ▸ Provides greater liability protection, but only for limited partners ▸ Partners pay tax on income received from the farm or reinvest ▸ No limit on number of partners, this allows for outside individuals to invest and share in the profits/losses	▸ Start-up administrative costs for a limited partnership may be greater than a general partnership and more time intensive ▸ General partners remain personally liable for any and all actions the partnership takes	–
Corporation	9.3%**	▸ Greater personal liability protection than other forms ▸ Facilitates fundraising - corporations may receive outside funds in exchange for equity or debt ▸ Perpetual existence	▸ Limited control on how the business operates ▸ Increased administrative (initial filing and annual fees) and mandated corporate tax fees (minimum $456)	Freight Farms, Inc.
				* % of all partnership ** % of all corporations

Figure 3 Cont.

Legal Structures - Pros and Cons				
Type	**% of farms in MA**	**PROS**	**CONS**	**Examples**
LLC	9.3%**	▸ Easier to form than a corp., farmer must file a certificate of organization with the state ▸ For LLCs with two or more members, members can elect to do pass through taxation ▸ For single member LLC (SMLLC), the member must account for all profits and losses on their individual tax filing ▸ If operating agreement is structured well, liability can be limited ▸ LLCs work well for farmers who want to transfer their businesses ▸ By utilizing an LLC instead of a corp., investor relationship can be more flexible	▸ Terminating an LLC can be difficult if the operating agreement is not worded well. ▸ Fees may be higher than in other arrangements, there is also paperwork and due diligence required with this structure that is not needed for general and limited partnerships and sole proprietorships ▸ Personal guarantee of debt may be required.	City Growers, LLC Higher Ground Farm, LLC Bloombrick Urban Agriculture, LLC
Cooperative	3.7%***	▸ More opportunities to raise capital ▸ Shared ownership, democratic structure	▸ Democratic processes can slow decision making	Farm Direct Coop, Little City Growers Cooperative
Nonprofit	3.7%***	▸ Risks and Liabilities are limited ▸ Tax-exempt ▸ Fulfills a social mission, ability to raise charitable funds	▸ Not easy to form ▸ Board of Directors has ultimate control ▸ Cannot generate significant profit for farmers	The Food Project, Urban Farming Institute (UFI), Nubia, ReVision Urban Farm
Blended Model	3.7%***	▸ Benefits of the for-profit structure and potential tax exemptions and benefits of the nonprofit entity	▸ Difficult to form, potential legal risks and threatening of the nonprofit status	City Growers, LLC & UFI

** % of all corporations
*** % of all other entities

Source: How to Choose a Business Structure: A Decision Guide by Wholesome Wave, Conservation Law Foundation, & CLF Ventures

Raising Start-up Capital

The legal structure an urban farm chooses to operate under can open or close funding and financing opportunities. Entities such as sole proprietorships and partnerships can limit one's ability to raise funds for the major costs of starting an urban farm; typically land, soil, and water. With these structures, if the owner does not have the ability to fund these costs through their own assets or personal loans, then they will have a difficult time getting their business off of the ground. The other for-profit models mentioned have the capacity to raise capital from a wider audience. The City of Boston has a resource page that is a helpful starting off point for those seeking financing options (See Appendix 1, page 52). The options range from federal grants to small business microloans. Some are specifically for farms and others are more generally for small businesses.

Several cities are addressing the problem of access to capital in creative ways. For instance, Baltimore reported "working with local lenders to investigate options for capitalizing urban agriculture operations (small grants, revolving loan fund, micro-loans)" (Hendrickson & Porth, 2012). Also, the Higher Ground Farm and City Growers, LLC in Boston used the popular crowdsourcing platform Kickstarter to raise funds from over 200 individuals (respectively) for capital and improvement costs. Both urban farms each raised between $20,000-$30,000 during their fundraising campaigns (Higher Ground Farm, 2013; City Growers, 2013). Recent online platforms lend themselves well to raising capital via community rather than through foundations or large venture capitalists. Similar to the CSA model, these backers typically get something in return.

Lastly, depending on the social network of the individual(s) who own and operate the farm, its important to remember close friends and family as potential lenders of capital.

Start-up Capital Costs

There are fundamental costs that regardless of what legal entity an urban farm utilizes will need to be taken into account. According to a study conducted by researchers at the University of Missouri, initial start-up capital is difficult to obtain and is a barrier for many potential farmers (Hendrickson & Porth, 2012). Figure 4 shows an example of the start-up costs TPL has incurred during the permitting and set up of two farm sites. They expect to spend about $679,000 for twelve 1/4 acre farm plots, which averages out to about $226,000 per acre.

Figure 4:

Start-up Expenses	Summer 2015 - Spring 2016
Salaries	$90,000
Design and Construction Services	50,000
Construction & Site Improvements	
Site Preparation	$30,000
Fencing	$6,000
Water Connection	$40,000
Environmental Barrier	$4,000
Soil/Compost	$60,000
Signage	1,000
Stewardship & Site Maintenance	10,000
Total Start-up Costs	$291,000
Source: Trust for Public Land	

In addition to sharing estimated figures, this section will link to potential policy solutions that could lower the barriers to entry into this industry and grow the amount of urban farms in Boston. Many of the policy themes touched upon in this section of the report will be further explored in the Wider Impacts and Policy sections. Any urban farmer moving from the business planning phase to the implementation phase in Boston should familiarize themselves with the permitting processes required to ensure their farm will be approved by the city: URBAN AGRICULTURE IN BOSTON: PERMITS AND APPROVALS NEEDED TO START YOUR LESS THAN ONE ACRE GROUND-LEVEL FARM

Land

As mentioned throughout this report, due to the parameters of our research, this report focuses on the transfer, leasing, and/or purchase of public land. While public land comes at a much more affordable price than privately owned land, both are scarce in Boston. Therefore, if an urban farmer is able to secure a plot of land in the city—it is crucially important that they hold onto this land for a number of years.

While it may seem more secure to be the titleholder of the land, there are pros and cons to being a landowner. Owning the land leads to increased land security and stability; but the costs of purchasing, remediating, and being solely responsible for maintaining land and its structures may be overly burdensome to farmers. Of course, some of these costs may be incurred whether the farmer is or is not the landowner, but the farmer's potential losses and liabilities could be mitigated if another person or entity owns the land.

On the other hand, in our conversations with current urban farmers in Boston some have tenuous land agreements, many of which are gentlemen's agreements, which have lead to uncertainty (Lloyd, 2015; Larkin, 2015). It is of note that most of the urban farm organizations our team interviewed throughout this process own little to none of the land they farm on.

What are the repercussions of this? And, how can one ensure that land in the city is preserved for this purpose and that urban farming entrepreneurs have stable places to farm? Community land trusts are an excellent solution that would allow urban agriculture to thrive while lowering the threat of gentrification, if structured properly.

Community Land Trusts

This section will explore how community land trusts can make urban agriculture more land secure and also benefit the whole community. Community land trusts (CLTs) are often formed in order to provide secure, affordable housing, but they are also being used to ensure communities have access to open spaces through such endeavors as urban agriculture. CLTs are nonprofits that are community based and community responsive through a democratically elected board and a commitment to use the land for the benefit of the area residents (Yuen, 2014). They allow the community to do with the land what ever they believe will benefit them the most.

The case study on the following page gives an overview of the innovate ways in which Boston's Dudley Square Neighborhood Initiative is reinventing its community land trust model to include urban farms.

Dudley Square Neighborhood Initiative (DSNI) Community Land Trust Case Study

Dudley Square Neighborhood Initiative (DSNI) is a non-profit community-based organizing and planning organization that focuses on the Roxbury/North Dorchester Neighborhood of Boston (Dudley Street Neighborhood Initiative Inc., 2014). DSNI opened its door in 1984, and by 1988 it added a community land trust to its organization called Dudley Neighbors, Inc. (DNI). For the past almost three decades, DSNI and its land trust have helped preserve these neighborhoods as places where working families can afford homes and build assets.

Today, DSNI has created another subsidiary to hold its urban agricultural land in a similar community land trust model: DNI4 (Smith, 2015). DNI4 currently holds The Food Project's (TFP) one and a half acre West Cottage farm site and since TFP is a non-profit, DNI4 provides a 99 year ground lease at the cost of $1/year.

DNI4 will also hold the TPL's Garrison-Trotter farm once TPL completes the set-up phase of the farm. Once this occurs, DSNI/DNI4 and TPL have a donation agreement to transfer the land from the ownership of TPL to DNI4 for $1. DSNI is firm in its commitment that it does not want to maintain or run urban farms in Boston, so the TPL partnership is ideal for DSNI since it will only inherit farms that are already operational.

DNI4 will subsequently lease the land to The Urban Farming Institute and others, its still deciding on the amount for the ground lease (Smith, 2015). Ideally, DNI4 would only hold farms that fall within DSNI's "Dudley Triangle". Since the Garrison-Trotter farm is outside of the "Dudley Triangle," DSNI and UFI have begun exploring UFI organizing its own community land trust to hold urban agriculture land (Smith, 2015). DSNI has begun providing fee-based technical assistance for those interested in setting up their own community land trusts in the Greater Boston area. DSNI is most interested in preserving the land in the area as the community members want it and, currently, many are calling for urban agriculture.

Water

Water connection costs in Boston start at $25,000, second to the cost of land (Conference). According to the City of Boston, urban farmers have two options for accessing water: either create a new connection to water service or tap into a neighbor's service with a cross-connection device (Harvard Food Law and Policy Clinic and the City of Boston Mayor's Office of Food Initiatives, 2014). The former can be a lengthy and costly process, therefore a farmer should try their best to select a site (or sites) where a copper water supply is entering the premises and is of an adequate size.

The run-off from a farm could potentially create an added expense once operations are up and running. An urban farm could save on this costs by utilizing the city's "golf course exemption," in which a farmer can come to an agreement with the Boston Water and Sewer Commission to have their sewage fees waived, if they can demonstrate that their water is not going to the sewer (contact Boston Water and Sewer Commission for the most up to date information).

Many of the cost savings suggestions in this area are linked to policy solutions. There are several ideas that other cities have implemented which would drastically lower the costs of securing a water connection. For example, in San Francisco the city has provided grant funding up to $10,000 to offset the installation of a new dedicated irrigation water service. Installation of the new water service is also performed by the city. If the installation does not exceed $10,000, the remaining grant funds may be used to rebate select costs associated with a properly installed back-flow prevention device (San Francisco Water Power Sewer). Missouri also has a discounted water hook-up rate for urban farms under their Urban Agricultural Zone legislation, this is discussed in further detail on pages 41-42.

The City of Seattle has the Saving Water Partnership which offers funding and technical assistant for businesses and individuals to conserve water. One of the options offered is that they provide up to 50 percent of the cost for irrigation upgrades that save water. View their extensive resources here: http://www.savingwater.org/LawnGarden/WateringIrrigation/AutomaticSystems/FinancialTechnicalAssistance/index.htm Additionally, Seattle Tilth has an excellent guide as to what water-related items farmers should be looking at when selecting and or assessing a plot and many cost saving measures: http://www.seattletilth.org/learn/water-smart-toolkit-pilot-edition Visit this website for more practical and policy ideas on water cost saving strategies: http://www.urbanaglaw.org/water/

Soil

In former industrial cities, there is always a concern that the soil is burdened with heavy metals such as lead, arsenic, and other toxins. Farmers must properly test their native soil to see what type of growing environment it would provide. In terms of lead, one of the most harmful metals typically found in urban soil, Massachusetts regards anything above 200ppm has hazardous and experts agree that a growing environment should have less than 100ppm of lead for both root and other produce to be safe for consumption (MA Exec. Office of Energy and Environ. Affairs). The BRA has regulations in place that requires all soil-based farms to complete a soil safety application and share the results of the testing with the city. The guidelines can be accessed here: Soil Safety Guidelines for Commercial Urban Farming.

There are studies that tout the effectiveness of low-cost soil treatments to reduce soil and dust lead hazards that cost between $1,000 – $6,000 (Dixon, 2006). Most farmers, due to safety reasons and consistent growing conditions, end up covering native soil with barrier fabric and trucking in clean soil to grow in (Kessler, 2013).

Crop Selection and Techniques

Just as important as securing land and turning your plot(s) into arable farm land, crop selection should be the next main concern. As mentioned, Trust for Public Land's focus is to return nature to urban areas, which makes indoor operations like aquaponics and freight farms out of the scope of this report. TPL's focus is on ground-level farming. Intentional crop selection for crops that both provide a high yield and high profit margin is one way to make ground-level farms economically sustainable.

One example of a high profit crop is garlic, especially hardneck varieties such as Purplestripe, Porcelain, and Rocambole (Wallin). Garlic does take up a lot of time in the ground—going in early fall and not ready to harvested until the following summer. It typically is out of the ground by July of each summer, leaving the land available for greens to sowed and harvested under the crop maximization technique, the SPIN model discussed on the following page. While garlic needs a sufficient amount of time and space—it must be planted at least 6 inches apart (Ford, Bogash, Orzolek, Kime, & Harper). It also demands high market prices, up to $10/lb (Wallin). Below is a nine season cost projection for one acre of farmable land where garlic is the only crop. Using a variation of TPL's start-up figures and other available data to provide cost and revenue estimates, in the scenario described in Figures 5 and 6 a farmer would reach their break-even point in their ninth year of operations.

Scenario A: Garlic only - 1 acre *(Figures 5 & 6)*:

Start-up Expenses (Garlic - 1 acre)	Summer 2015 - Spring 2016
Salaries	$40,000
Design and Construction Services	$50,000
Construction & Site Improvements	
Equipment (Hoses, Tillers, Vehicle(s,) Season Extension)	$25,000
Fencing	$6,000
Water Connection	$40,000
Environmental Barrier	$4,000
Soil/Compost	$30,000
Signage	$1,000
Stewardship & Site Maintenance	$10,000
Total Start-up Costs	$206,000

Expenses - 1 acre of garlic	Summer 2016 - Spring 2017	Summer 2017 - Spring 2018	Summer 2018 - Spring 2019	Summer 2019 - Spring 2020	Summer 2020 - Spring 2021	Summer 2021- Spring 2022	Summer 2022 - Spring 2023	Summer 2023 - Spring 2024	Summer 2024 - Spring 2025
Wages and Salaries (3% increase/year)	$48,150	$49,595	$51,082	$52,615	$54,193	$55,819	$57,494	$59,218	$60,995
FICA/Worker's Comp. (3% increase/year)	$7,800	$8,034	$8,275	$8,523	$8,779	$9,042	$9,314	$9,593	$9,881
Insurance (1% increase/year)	$1,000	$1,010	$1,020	$1,030	$1,041	$1,051	$1,062	$1,072	$1,083
Distribution (3% increase/year)	$6,500	$6,565	$6,631	$6,697	$6,764	$6,832	$6,900	$6,969	$7,039
Garlic Bulbs	$24,000								
Misc. (increase by 1% per year)	$1,500	$1,515	$1,530	$1,545	$1,561	$1,577	$1,592	$1,608	$1,624
Utlities (increase by 1% per year)	$1,200	$1,212	$1,224	$1,236	$1,249	$1,261	$1,274	$1,287	$1,299
Operating Costs	$90,150	$67,931	$69,762	$71,647	$73,586	$75,582	$77,635	$79,747	$81,921
Revenues									
Garlic @ $10/lb & $2.50/ft (1% increase/year)		$107,100	$109,242	$111,427	$113,655	$115,928	$118,247	$120,612	$123,024
Ending cash balance	($296,150)	($256,981)	($217,501)	($177,721)	($137,652)	($97,305)	($56,693)	($15,828)	$25,275

Note: For every acre of land, 1,500 lbs of garlic bulbs can be planted (100 lbs of organic hard neck garlic cloves = $1,600 X 15 = $24,000) (Keene Organics). You can save cloves from your own harvest and don't need to invest in cloves for future seasons. For every 1,500 lbs of bulbs per acre you plant, it would yield approximately 9,000-12,000 lbs harvest, which would create $90,000-120,000 of revenue (High Mowing Seeds).

In Scenario A, on the previous page, it takes nine seasons for this farmer to break-even, this is not an optimal scenario. It shows that even if a farmer is selling a crop that fetches a high price on the market, this is not sufficient. The scenario below will show that economies of scale (this next scenario has 3 acres of land) and maximizing the use of the land helps significantly with a farm's bottom line.

This next scenario shows a mixture of garlic and greens on three acres of land (Figure 7). As mentioned, there is a time in the summer where the garlic is out of the ground and greens can be sown before the garlic bulbs are placed into the ground in the fall. In Scenario B, the assumption is being made that only one batch of greens will be harvested during this gap time in the summer, even though greens can be harvested multiple times from the same bed (Phillips, 2013). Greens can also yield about $10/lb.

The start-up costs in this scenario will be set at $679,000, this is TPL's start-up cost estimate for its 12 quarter acre plots. The garlic costs, yields, and pricing estimates used in Scenario A are also used in Scenario B. Additionally, the greens yield and revenue estimates are adapted from City Growers, LLC actual figures. In Scenario B the farmer is able to reach a more sizable break-even point much more quickly. Interesting information on growing greens can be found here: New Leaf Farm Focal Crop: Salad Mix

Scenario B - Garlic and Greens - 3 acres *(Figure 7)*:

3 acres - Garlic & Greens	2016	2017	2018	2019	2020	2021
Head Farmer (3% increase/year)	$43,300	$44,599	$45,937	$47,315	$48,735	$50,197
Full-time Assistant (3% increase)	$30,000	$30,900	$31,827	$32,782	$33,765	$34,778
2 Seasonal workers (3% increase)	$21,000	$21,630	$22,279	$22,947	$23,636	$24,345
FICA/Worker's Comp.	$18,860	$19,426	$20,009	$20,609	$21,227	$21,864
Insurance (1% increase)	$3,000	$3,030	$3,060	$3,091	$3,122	$3,153
Distribution (1% increase)	$19,500	$19,695	$19,892	$20,091	$20,292	$20,495
Mustard Green Seeds (3 acres)	$400					
Garlic Bulbs (3 acres)	$72,000					
Misc. (1% increase)	$4,500	$4,545	$4,590	$4,636	$4,683	$4,730
Utlities (2% increase)	$3,600	$3,672	$3,745	$3,820	$3,897	$3,975
Operating Costs	$216,160	$147,497	$151,340	$155,291	$159,356	$163,535

Revenues						
Greens @ $10/lb (1% increase)	$21,000	$21,210	$21,422	$21,636	$21,853	$22,071
Garlic @ $10/lb (1% increase)		$318,150	$321,332	$324,545	$327,790	$331,068
Ending cash balance	($874,160)	($682,297)	($490,883)	($299,993)	($109,706)	$79,898

In urban farming, where land is at a premium, every decision has a large impact on whether an operation is profitable. Scenario B is a simplified version of SPIN farming which is one of the more recent innovations in farming techniques specific to low acreage farming operations. SPIN stands for small plot intensive farming *(SPIN Farming LLC, 2015)*. SPIN calls for growing crops in quick succession so that each bed produces 3-4 crops each season and that each crop grown generates at least $100 per crop per bed *(Christensen, 2007)*. Each bed in SPIN is usually 25 ft long by 2 ft wide *(Christensen, 2007)*. Other

innovations include farming hydroponically within freights *(Freight Farms, 2014)* as well as farming fish and hydroponic greens in aquaponics and multi-level greenhouses *(Growing Power, 2014)*.

Additional Techniques

Growing value-added crops can boost the profits of urban growers. Boston farmers could grow for vendors like Nella Pasta, who source locally grown produce for their ravioli, or could rent space from a commercial-grade kitchen like Crop Circle Kitchen in Jamaica Plain to create value-added products such as pesto, salsa, jams, spreads and kraut. Crop Circle Kitchen costs $900 to begin, which includes a security deposit – $600 – and first month's rent – $300 (Crop Circle Kitchen, 2014). Each month's rent includes 10 hours in the space; each additional hour costs $30 (Crop Circle Kitchen, 2014). Or a nonprofit, like the Urban Farm Institute, could access funds through grants to build a community kitchen for small-businesses to develop value-added products from the produce of urban farms (Hagey, Rice, & Flournoy, 2012). An excellent example of a highly profitable value-added crop are wine grapes, this next case study illustrates a successful example of a value-added crop model.

Wine Grapes of Chateau Hough (Cleveland, OH) Case Study

Chateau Hough in Cleveland, Ohio has shown that within a few years of creation, urban wineries have the potential to turn a sizable profit. Chateau Hough is a ¾ acre plot of land that exclusively grows wine grapes (Sax, 2015). Mansfield Frazier (pictured on the right) founded it in 2010 with a $15,000 grant from the city and $8,000 of his own money (Sax, 2015). Most of this initial capital went into purchasing a trellis system for wine grapes (Frazier, Inquiry into Chateau Hough, 2015). This initial infusion of capital is similar to any other urban farming operation.

Wine grapes are not an instant yielding crop. Once the vines are planted, the grapes must be pinched off as soon as they form for the first 3-4 years to send all of the energy the plant is producing to its root system. Frazier grows Frontenac, which is a hardy Minnesota red grape, and Traminette, which is a white grape developed in New York (Sax, 2015). Chateau Hough harvested a year earlier due to all of the hype about their product. The yield of ¾ of an acre is currently 2,000 bottles. When the vines become fully mature, which takes seven years from the time of planting, Frazier expects that to grow to 3,000 bottles (Frazier, 2015).

Of course, wine grapes cannot be sold at a farmer's market or at a farm stand as is. Instead wine grapes are grown as part of a value-added product: wine. Frazier rents production space at an off-site location. In Ohio, a wine can contain 80 percent of a foreign grape and the maker can still call it their own product (Frazier, 2015). At Chateau Hough, Frazier says that 70 percent of each bottle is his own grapes mixed with 30 percent of Californian grapes (Ibid).

Currently, Chateau Hough is organized only as a 501c3 non-profit. Since Chateau Hough does not yet have a wine license, it cannot sell its wine commercially. Instead it has been giving it away as gifts when people donate to the organization. Frazier has plans to create a wine processing plant in Cleveland and get a winery license, so that they can distribute locally to restaurants as well as sell from a storefront. Due to the locavore movement that has taken off in recent years, there is a market in Cleveland for Chateau Hough's product. Another way that they will increase profit is they will hold a portion of each season's wine to age. Frazier explained that older vintage wines fetch higher prices (Frazier, 2015).

According to Frazier's projections, 2016 will be the first year that Chateau Hough turns a profit. This projection is based on the average bottle being sold at $28.40 (Frazier, Urban Agriculture Zone: Winery Expansion, 2015).

The feasibility of urban wineries in Boston

Lessons Mansfield has learned can be applied to the urban agricultural scene in Boston to ensure economic sustainability in the sector. Glynn Lloyd, formerly of City Growers, said that City Growers, LLC expects to break even in 2015, five years after starting. Similarly, Chateau Hough is on track to break even about five years after starting. The difference between the two is that Chateau Hough's profit margins will be significantly higher due to the product they are creating. Frazier has projected that when the ¾ acre farm is fully operational, its profit margin will exceed $200,000 (Frazier, 2014). Frazier is also very willing to offer technical assistance to those who are interested in starting an urban winery in Boston (Frazier, 2015). There are also a number of wineries in the southeastern part of Massachusetts that could consult on the best vines: Westport Rivers, Turtle Winery, etc.

Last year, in the process of making it easier for out of state wineries to send alcohol directly to customers' door steps, Massachusetts legislators accidentally dropped a provision of law that allowed small wine and hard-cider producers to self-distribute (Adams, 2014). They insist they will fix it this session, which ends on July 31, 2016. That would be essential for urban wineries to succeed in Massachusetts because urban wineries will be delivering small quantities to area restaurants and farmer's markets.

Unfortunately Westport Rivers, a winery in southeastern Massachusetts, does not have the capacity to lease space to outside producers (Stewart, Inquiry, 2015) nor does Turtle Winery. This would require either partnering with a winery to see if they want to collaborate on a wine or developing a production space. Production space could be incorporated into the food hub that is discussed further on in this paper.

Besides wine grapes producing a profit, urban wineries can offer neighborhood revitalization akin to what craft breweries have been doing across the country (Renooij, 2015). Craft breweries attract both social and economic capital through the physical location of the breweries and likely attached taprooms or pubs (Renooij, 2015). An urban winery with an attached wine tasting room could also impact the surrounding neighborhood in a similar way. Urban wineries have the added factor of having their products grown and potentially processed on site, which would attract people not only to enjoy the final product but also attract those who are interested in seeing the process from start to finish. Although Mansfield does not yet have a tasting room on site, he knows that "if I'd planted bell peppers, you wouldn't be here" (Sax, 2015). An urban winery would bring a certain "je ne sais quoi" to the neighborhood it would be located in. Consequently, an urban winery will influence gentrification, which is why the community land trust model mentioned in the Land section of the this report is critically important to not only urban farms, but the neighborhoods surrounding them.

If TPL is not interested in designating one or more of their particular plots as a winery, we recommend lining each plot with vines to supplement the income from more traditional vegetable farming that would immediately benefit the local community.

Distribution

The type of distribution channel(s) an urban farm chooses can increase an operation's sustainability. There are four major distribution choices in a city like Boston: CSAs, farmer's markets, farm stands, and wholesale.

Figure 8:

Top Methods of Crop Distribution			
Method of Distribution	**Definition**	**PROS**	**CONS**
CSAs	Community supported agriculture; the farmer sells shares of expected produce to customers that are picked up weekly; in a bad year, customers receive less produce. Conversely, in a good year, customers receive more.	Raises capital before season to purchase seeds, offset overhead costs, etc.	Resource rich: boxes for produce each week & reserved area of land for boxes each week; farmers need to grow a plethora of varieties to keep customers interested and returning.
Farmer's Markets	Each farmer purchases a table for the duration of the season and sell directly to individual customers	Can create direct relationships with individuals who could then could recurring customers or CSA members	Small time slots; weather dependent; resource rich; needs to be staffed by at least one person who could otherwise be contributing to production
Direct Sales	Direct sales to restaurants or wholesale venues	Can create relationships with restaurants that could lead to a strong working relationship (i.e., growing custom crops for the restaurant). Restaurants yield highest profit margin compared to other distribution models.	Direct sales to grocery stores net smallest profit margins. Poor crop season could damage or end relationship with a restaurant or market
Farm Stands	On-site farm stands sell directly to neighbors	Farmers can sell directly while also doing farm tasks; can be semi-permanent (not much capital needed)	Possible vermin attracted by produce if it is not composted properly

Although CSAs produce capital pre-season, which is something all farmers, especially urban farmers lack, the labor involved in a CSA model will not ultimately produce sustainability and profitability for an urban farm. CSAs rely on a strong diversity of crops in order to attract customers. That involves a lot of planning pre-season to ensure that crops are rotated each season to ensure strong soil for each crop. Urban farms, such as ReVision Urban Farm, partner with more rural farms to produce more crop diversity and create a larger, more appealing CSA, but that just adds another administrative layer. CSAs are a lot of logistical planning overall because each week not only does the harvest need to be divvied up amongst CSA members, but then it needs to be boxed and kept in a cool place until pick up. Rarely do urban plots have a cool spot on site, so then the shares must be transported.

Farmer's markets for small urban farm plots allow farmers to sell what they have, but they are labor intensive. Direct sales to restaurants prove most feasible for small producers because restaurants purchase significant quantities at a time and are reliable customers who pay a premium for the produce. What urban farming enterprises, like City Growers have done is create relationships with chefs and grow what the chefs want, almost on a contract-basis. Farm stands on-site can be a way of supplementing this income and building community in the neighborhood. A person who is working in the fields can also staff the on-site farm stands. Like farmer's markets, the on-site farm stand can sell what is available, but without the time and money of transit.

References

Pathways to Profitability Data and References		
	Choosing a Legal Business Structure	(Food Law & Policy Clinic of Harvard Law School for Conservation Law Foundation, 2014) (Mass. General Laws) (Tettlebaum, 2014) (Chin, 2013) (City of Boston, 2013) (Conference) (Gunther, 2010) (Mass. General Laws) (Rayburn, 2013) (University of Missouri Extension, 2015) (Mihaly, 2015) (Freight Farms, 2014)
	Raising Start-up Capital	(Hendrickson M. P., 2012) (Higher Ground Farm, 2013) (Growers, 2015)
	Start-up Capital Costs	(Hendrickson M. P., 2012) (The Trust for Public Land, 2015) (Lloyd, 2015) (Larkin, 2015)
	Crop Selection & Cost Projections	(Wallin), (Phillips, 2013), (Lloyd, 2015), (Global Green USA, 2012), (Keene Organics), (High Mowing Seeds)
	Value-added products	(Crop Circle Kitchen, 2014) (Hagey, Rice, & Flournoy, 2012)
	Urban Winery	(Sax, 2015) (Frazier, Inquiry into Chateau Hough with the Founder, 2015) (Frazier, Urban Agriculture Zone: Winery Expansion, 2014) (Frazier, Urban Agriculture Zone: Winery Expansion, 2015) (Adams, 2014) (Stewart, Inquiry, 2015), (Renooij, 2015)
	Economic impact of surrounding neighborhood	(Renooij, 2015)
	Varieties of Farming on Small Plots	(SPIN Farming LLC, 2015), (Christensen, 2007), (Growing Power, 2014), (Freight Farms, 2014)

Economic & Community Impacts

Community activists, farm operators, and city planners are all actively seeking to establish processes for quantifying the range of impacts which urban farming programs have on the community. The effects of urban farming have numerous impacts on the community that can be difficult to monetize. The challenge in defining the benefits of urban agriculture creates an underlying uncertainty of the role of urban agriculture in a city where priorities for land include affordable housing, retail space for small businesses, and other competing uses (Colasanti K. L., 2010). Without enumerating the benefits and monetizing their value, urban ag projects can appear to be an ineffective use of valuable property.

With sufficient data and metrics to validate the impacts of urban agriculture, the 'return on investment' can be recalculated to include the vast array of indirect benefits to the community. Community agriculture can reduce a neighborhood's waste by reusing compostable waste to improve soil and reducing storm water runoff. It also provides programs and opportunities to facilitate education about natural systems, environmental science, nutrition, and small business. The community impacts of urban farming activities can be summarized in four main metrics: Economic, Social, Environmental, and Health.

Significant research exists on the evaluation of urban agriculture impacts (see Research & Methodology). While some effects are easily measurable – such as the number of jobs created, amount of produce sold, or number of community members educated – there are many direct and indirect benefits of urban farming which are more difficult to quantify.

Urban agriculture projects can result in improvements to local citizens' health by increasing access to healthy foods, encouraging physical activity and improving food-health literacy. Urban ag projects can also yield environmental benefits by removing nearly all food transportation requirements, minimizing waste and packaging material, improving stormwater management and air quality, and reducing the use of chemical additives and pesticides. The farms may improve community spaces and provide an environment for positive social interactions, as well as develop the skills and social capital of the community members. Economic benefits include increases in property values (so long as displacement is minimized), lower foreclosure rates, access to professional skills development programs, and facilitation of entrepreneurship and small business initiatives. The effects vary by site and community, and thus a robust tool must be used to measure the developments across a range of farming operations.

"Urban farms are growing more than just food, they are growing community."
~ Cheryl Kollin (Kollin, 2010)

In order for city planners and urban ag stakeholders are to advocate that valuable land should be turned into urban farms, the value of the benefits must be quantified with respect to income generated by housing on equivalent property sizes. The Garrison-Trotter farm, which is situated on a lot just over 12,000 square feet, will generate between $17,000-$21,000 in revenue annually. A housing development on an equivalent-sized lot will generate between $6,000-$14,000 in tax revenue for the city. To validate urban farming's impacts on the community compared with housing, benefits to the city must be monetized above $6,000.

The economic and social benefits of urban ag are the most significant benefactors to the community. Food production is the main source of income for most urban farm entities. Employment opportunities for community members also provide economic benefits to the area. The educational and human capital development opportunities provide substantial benefit to the residents, enabling residents to find gainful employment or start small business ventures. In addition, housing values can improve and foreclosure rates can be reduced near active urban farming sites. The multiplier effect of money transfer with an urban farming entity also helps more wealth remain in the community.

Urban farms can revitalize neighborhood dynamics and create safer streets, resulting in more positive associations and community well-being. They can provide numerous educational benefits for both youth and adults. By harnessing two sources of capital—social capital and the existing built environment—urban farming uses the inherent strengths of cities to solve some of their most serious problems. Urban farming sites allow residents to build trust and engage in mutually beneficial activities together.

Costs

- Startup Costs
  - Zoning and Regulation Permitting and Fees
  - Property Acquisition (Lease, Mortgage, In-Kind, …)
  - Water Service Connection
  - Pre-Production Infrastructure
    - Facilities (Hoop Houses, Raised Beds, etc.)
    - Soil
    - Equipment and Tools
- Operational Costs
  - Property
    - Lease/Mortgage/Loans
    - Taxes
  - Utilities
    - Water
    - Solid Waste Management
    - Electricity
    - Gas
    - Internet/Telephone
  - Production and Operations
    - Seeds
    - Transportation and Delivery
    - Labor
    - Equipment Maintenance
    - Packaging
    - Food Processing and Preparation

Benefits

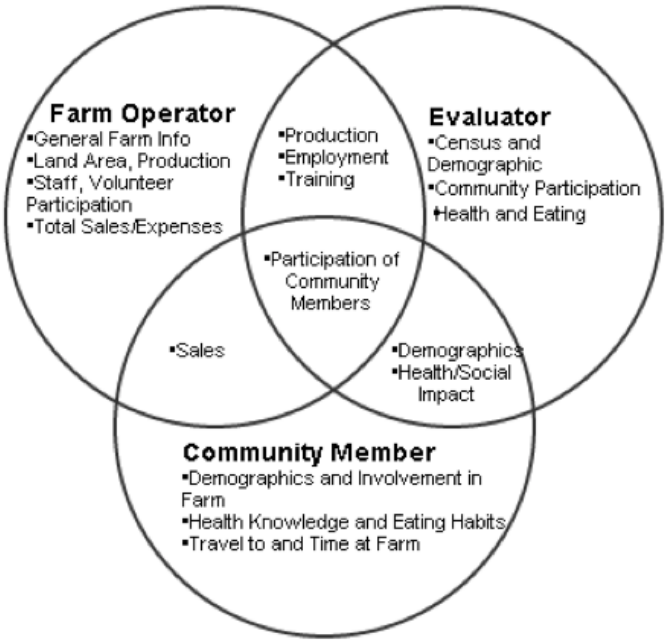
- Economic
  - Food Production
  - Employment
  - Housing and Property Values
  - Decreased Foreclosures
  - Job Training and Skills Development
  - Food Miles (Transportation Costs)
  - Small Businesses and Entrepreneurship
  - Healthcare Costs
  - Capital Investments
  - Multiplier Effect
- Social
  - Creating Community Spaces
  - Educational Benefits
  - Diverse Community Interactions
- Environmental
  - Waste Disposal and Landfill Expenses
  - Stormwater Management
  - Air Quality
  - Production and Packaging
  - Composting and Natural Nutrient Supply
  - Urban Heat Island
- Health
  - Access to Healthy Foods
  - Food-Health Literacy
  - Physical Interaction Activity

Evaluation Metrics

A detailed listing of research and benefits are documented in various reports and publications. Notably the Five Borough Farm created a Metrics Bibliography which provides reference for many benefits of urban agriculture (Five Borough Farm) in addition to benefits and supporting research from the Growing Green study by the Conservation Law Foundation (The Conservation Law Foundation). For a thorough literature review of social, health, and environmental impacts of urban agriculture, consult the Sheila Golden's report from the UC Sustainable Agriculture Research and Education Program (Golden). A more thorough analysis of this research for all benefits can support the development of practical and effective metrics and data collection methodologies. For more detailed information on the economic, social, environmental, and health indicators discussed herein, please see Appendix 2.

Measuring Benefits

In order to fully measure the impacts of urban farming operations and activities, three data collection mechanisms are needed.



1. **Farm Operator Data Collection**
   The first tool is for farm operators to collect and track data about their farming operations, such as the food production by crop, area of farm, staffing, programming, composting, and more (see Proposed Data Collection Instrument).

2. **Community Member Survey**
   A survey tool should be provided to community members who participate in the farm activities (staff, volunteers, patrons, or participants in programs and events) to identify demographic information, health patterns, and amount of time spent participating in farm-related activities.

3. **Independent Evaluation**
   In addition to a farmer data collection tool and community survey, an evaluator should be utilized to independently assess metrics such as community participation rates, average time spent on-site, changes in eating patterns, and other social, economic and health measures.

Several tools and techniques have been established to collect baseline metrics such as crop types and harvests, compost quantities and waste diversion, and participation from the community. However a comprehensive survey and data management tool does not exist yet to help evaluate and monetize secondary benefits (Schmelzkpf, 1995).

There are some existing initiatives which measure food production in aggregate from urban farm sites. Few tools, however, go beyond the basic crop types and yields, and thus the existing metrics by which to measure urban agriculture projects are minimal.

Farming Concrete - Barn

The most useful model is Farming Concrete's "Barn", an online data collection, storage and presentation platform. Launched in 2009, Farming Concrete is an open, community-based research project started by gardeners to measure how much food is grown in New York City's community gardens and school gardens. In the effort to track impacts of urban farming activities, the Five Borough Farm and Design Trust for Public Space in NYC have created the tool so that farm operators can easily enter information and track it over time for both public awareness and aggregate data collection. Barn provides farm operators a platform through which to log their data, while the Mill site provides access to the public to view and aggregate the data. The tool was developed as a way to validate the impacts of urban farming sites such that city planners and community members would not seek to build housing or businesses on the site.

While the Barn application will allow any entity to add a farm to the database and begin collecting information, there are currently no Massachusetts-based entities utilizing the tool. The Barn data collection tools is fairly robust, but the time-consuming collection and entry of accurate data may create challenges for the users (farm operators). The tool can be printed in a handbook with instructions, and an online portal supports the entry of data by the farm operators. The Barn tool is a well-built example of a universal tool that facilitates collection of:

Figure 9:

BARN Data Collection Instrument	
Health	**Environmental**
Changes in Attitude (Taste-Tests)	Landfill Waste Diversion (By Weight/Volume)
Changes in Attitude (Mood Observations)	Compost Production (By Weight/Volume)
Healthy Eating	Rainwater Harvesting
Beauty of the Garden	
Food Production	**Social**
Crop Counts	Participation in Farm by Task
Harvest Counts	Participation in Farm by Project
Economic	Participation by Geography
Market Sales (Product, Unit Price, Units Sold)	Skills and Knowledge
Donations of Food	Reach of Programs (Length, Age, Gender, Location, Purpose)

Mara Gittleman, a representative of Farming Concrete and the Barn team and Farm Education Manager at Kingsborough Community College, described an interest in having more farmers utilize the platform (Gittleman, 2015). The toolkit was created in conjunction with farmers to solicit their most critical metrics. Some farm managers utilize the tool purely as a data collection and aggregation platform, while some leverage the system to set goals and compare their production capacity with similar enterprises. Oftentimes farmers have used Barn in connection with fundraising efforts to share their output with investors and supporters.

In addition, the Mill site (Barn's public data access platform) allows anyone to view, sort and analyze the aggregate data. This provides researchers and investors with valuable datasets to reference. The validity of the data is difficult to control, as Barn is a public and open-access service, however they have designed "Groups" to easily aggregate selected sites.

The Barn tool is not used in full by most farmers; many of the 16 metrics which are currently available require weekly or near-daily data collection, a burden that most farmers are unable or otherwise unwilling to add to their set of tasks. In general, farmers are inclined to collect only the data which are important for them to measure, but can be convinced to participate in some group studies and aggregate efforts for research and evaluation purposes (See Appendix 2 for tool).

The function and design of the Barn website may be leading to lower use of a larger set of metrics. A simpler data entry interface condensed onto a single page or set of 4 core pages could streamline the user experience which currently requires navigation to several separate pages with minimal content. A mobile-based version of Barn may also allow farmers to collect data 'on-the-fly' and provide photo documentation of the metrics.

Figure 10:

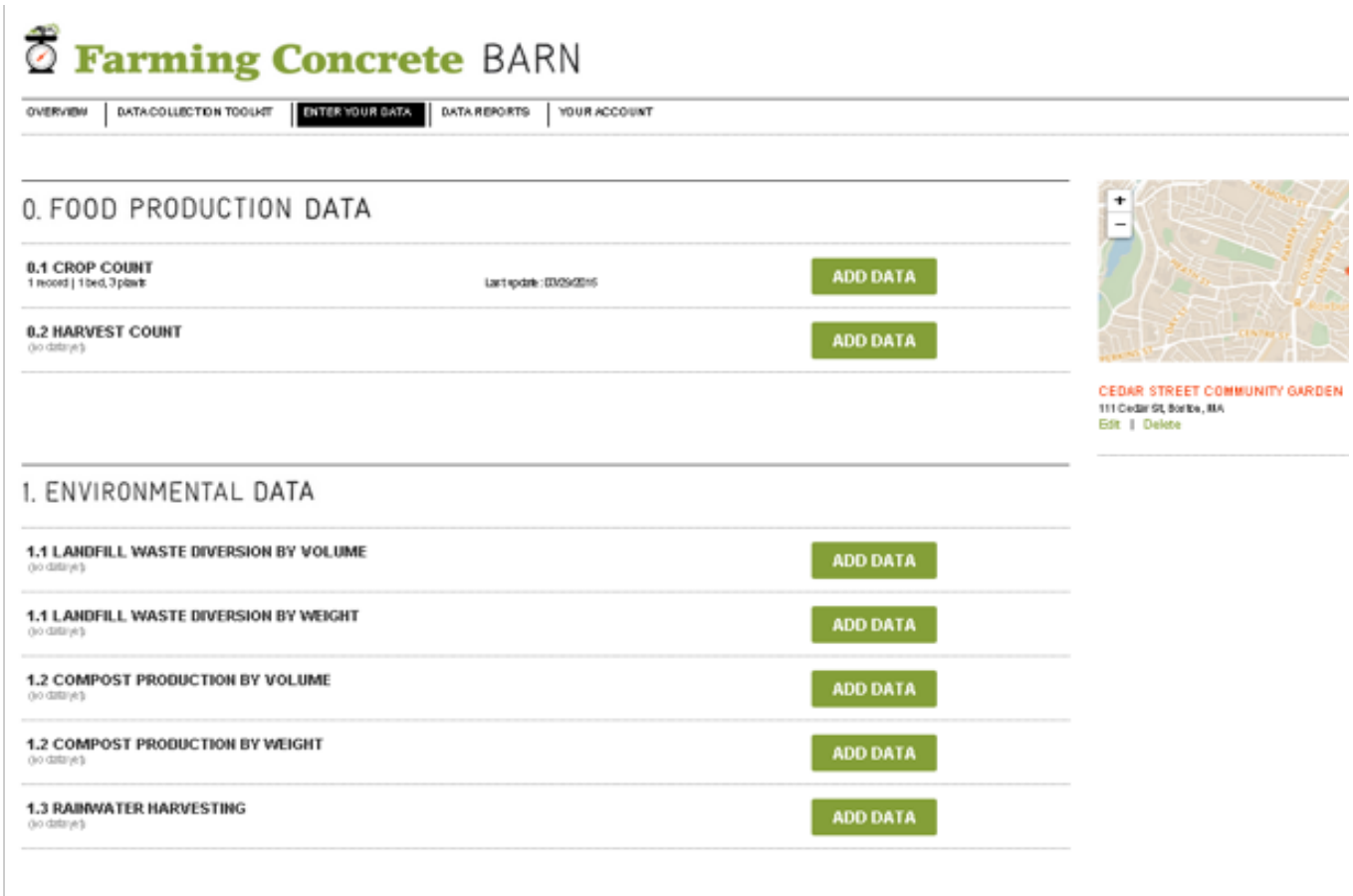
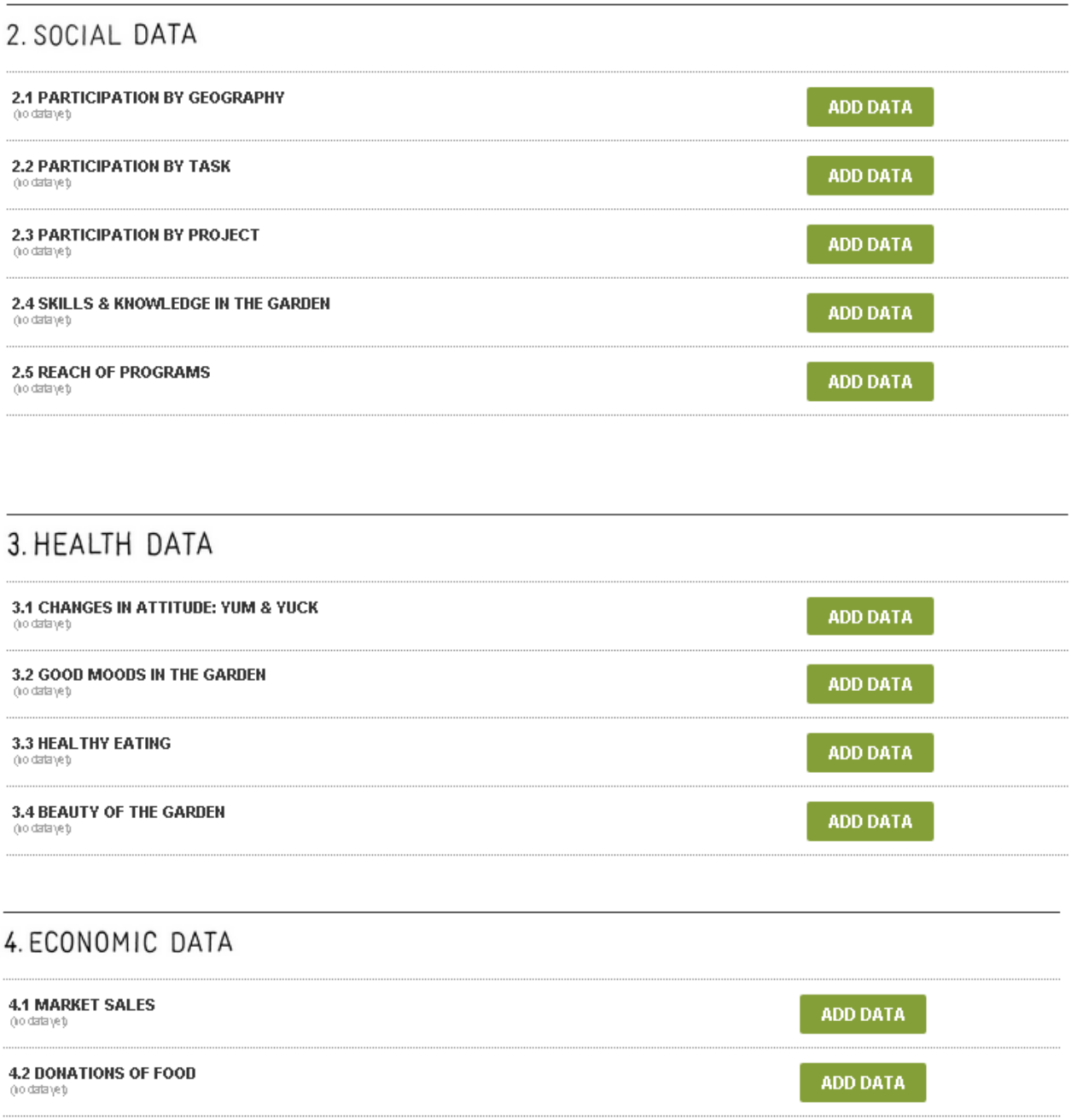


Figure 10 (cont.):



Farm Operator Data Collection Instrument

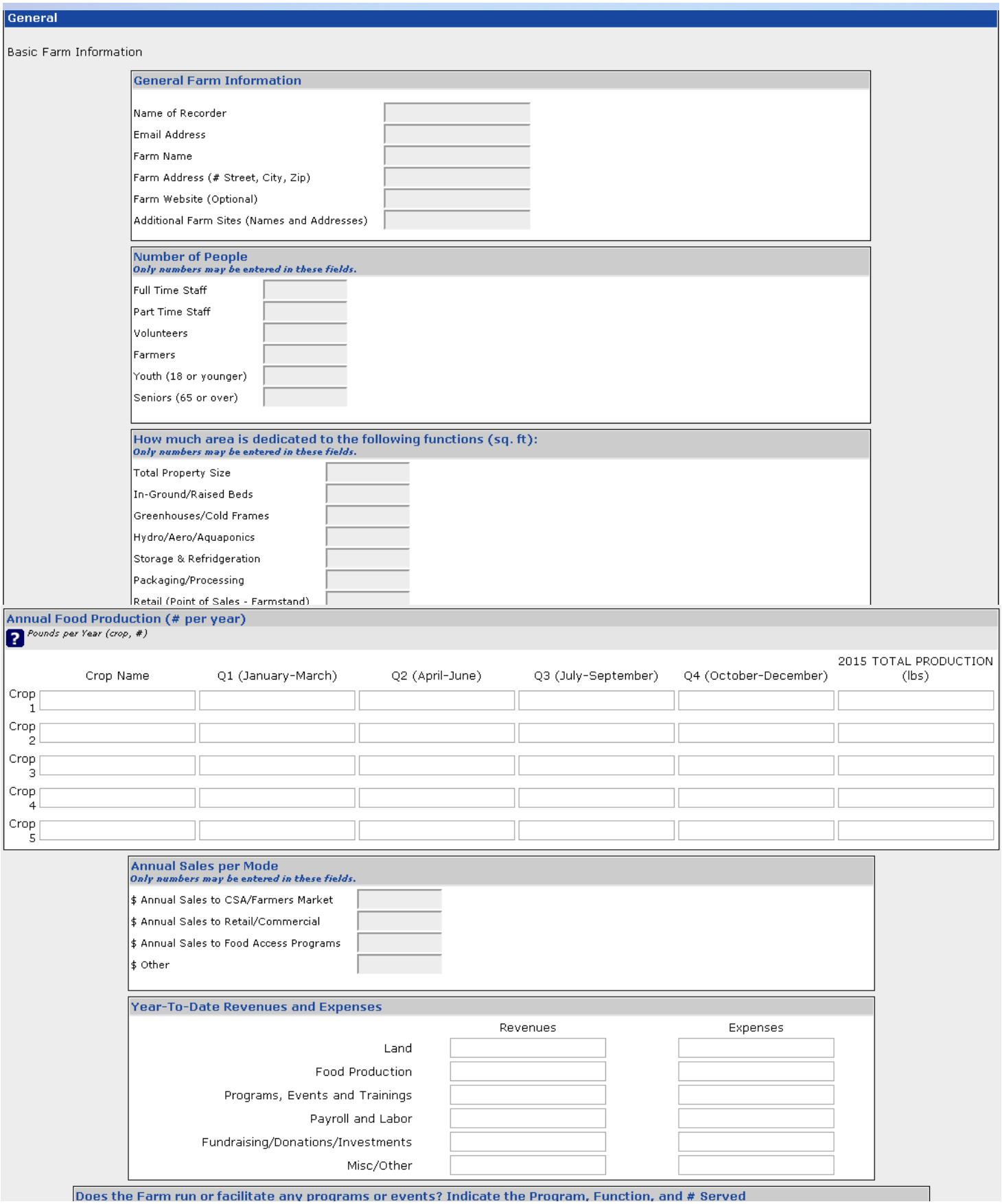
The Capstone team has developed an independent data collection instrument which can be modified and utilized by urban farming operators within the City to track key metrics and achievements. The proposed tool is a model for future development, either in conjunction with Farming Concrete or as a separate initiative. The tool can be access at the following website: www.farmsurvey.limequery.com

Figure 11:

Farm Operator Data Collection Instrument		
General	**Sales and Programs**	**Production**
Farm Name(s)	Sales to CSA/Farmers	Crop Production
Farm Address(es)	Sales to Food Access Programs	Compost Production
Website/Contact Information	Sales to Retail/Commercial	Food Packaging and Processing
	Types of Programs and People Served	
Staff	**Area**	**Utilities**
Full Time Staff	Total Property Size	Energy Use and Sources
Part Time Staff	In-Ground or Raised Beds	Water Use
Volunteers	Greenhouses/Cold Frames	Waste Produced (Non-Compostable)
Participants in Programs	Hydro/Aero/Aquaponics	Rainwater Capture
Number of Youth and Seniors	Storage and Refrigeration	
Average Time On-Site	Packaging/Processing	
	Retail (Point of Sales)	

The tool includes many metrics which may be difficult for farm operators to collect. Consistent with the findings from Barn, operators should be expected to maintain data on only those metrics most critical to their personal operations. Farm owners and managers can be encouraged to keep metrics for public aggregation when feasible and consistent with their current operations. These metrics are intended to be easy to identify and evaluate, and helpful for operators to track over time.

Figure 12:



General

Basic Farm Information

General Farm Information

Name of Recorder
Email Address
Farm Name
Farm Address (# Street, City, Zip)
Farm Website (Optional)
Additional Farm Sites (Names and Addresses)

Number of People

Only numbers may be entered in these fields.

Full Time Staff
Part Time Staff
Volunteers
Farmers
Youth (18 or younger)
Seniors (65 or over)

How much area is dedicated to the following functions (sq. ft):

Only numbers may be entered in these fields.

Total Property Size
In-Ground/Raised Beds
Greenhouses/Cold Frames
Hydro/Aero/Aquaponics
Storage & Refridgeration
Packaging/Processing
Retail (Point of Sales - Farmstand)

Annual Food Production (# per year)

Pounds per Year (crop, #)

	Crop Name	Q1 (January-March)	Q2 (April-June)	Q3 (July-September)	Q4 (October-December)	2015 TOTAL PRODUCTION (lbs)
Crop 1						
Crop 2						
Crop 3						
Crop 4						
Crop 5						

Annual Sales per Mode

Only numbers may be entered in these fields.

$ Annual Sales to CSA/Farmers Market
$ Annual Sales to Retail/Commercial
$ Annual Sales to Food Access Programs
$ Other

Year-To-Date Revenues and Expenses

	Revenues	Expenses
Land		
Food Production		
Programs, Events and Trainings		
Payroll and Labor		
Fundraising/Donations/Investments		
Misc/Other		

Does the Farm run or facilitate any programs or events? Indicate the Program, Function, and # Served

Community Member Survey

A community member survey is needed in order to evaluate key metrics including demographic, health and lifestyle data. A sample version of the tool can be viewed in the Appendix section Community Member Survey. The community member survey can be facilitated by offering small incentives for completion – credit or savings for future purchases.

Figure 13:

Community Member Survey		
Demographics	**Health and Eating**	**Travel and Time**
Race/Ethnicity (as per Census)	# Fruits/Vegs Eaten per Day (avg)	Travel by Foot/Bike/Car/Bus/Train
Individual/Couple/Family	# Times Eaten Fast Food in Past Week	Weekly Average Time Spent at Farm
Customer/Volunteer/Staff	$ of Food Purchased at Farm per Month	Walking Time from Home to Farm
Annual Household Income (optional)	Nutrition and Diet Willpower	Walking Time from Home to Grocery Store
# of Years Participating in Farm	SNAP or Food Subsidy	
Participation in CSA	Nutrition Interest/Aptitude/Knowledge	
Participation in Health-Related Programs		

Independent Evaluator Instrument

In order to fully assess the impacts of urban agriculture initiatives, an independent evaluator should be utilized to develop city-wide metrics and data. Farm operators are generally stretched for time and unable to maintain proper collection of data such as community unemployment, participation and attitudes, healthy eating habits, impacts on small business and entrepreneurship, and other non-operations-related data. It is recommended that farm owners and city administrators work collaboratively to finance consistent independent evaluation of farming operations.

Figure 14:

Independent Evaluator Instrument		
Census and Demographic	**Community Participation**	**Health and Eating**
Median Household Income	# of Participants in Programs and Events	Consumption Rates of Fruits/Vegetables
Unemployment Rate	Person-Hours Spent Farming	Health Education and Awareness
Race and Ethnicity	Youth and Senior Participation	
Social	**Economic**	**Environmental**
Mood Changes and Attitude	Number of Paid Staff and Earnings	Water Capture and Re-Use
Perceptions of Healthy Eating	Participation in Job/Skills Training	
Perceptions of Environment and Safety	Impact on Small Business/ Entrepreneurship	

Impact on Boston

In order to evaluate the potential economic impacts of urban farming to the City of Boston, an analysis of the current land availability is required. Fortunately there is also widely available research on urban farming land prospect analysis, and an available public land analysis was completed on behalf of TPL in 2013 by a graduate team from Tufts University (Chin, 2013). In this analysis, 52 potential sites (with an area of approximately 28 acres) were identified with the adequate size and environment for an urban farm project.

Of the 10 sites which the Tufts team identified as most promising for urban agriculture, 5 have since been allocated to other projects. The capacity for urban farming sites in Boston is rapidly diminishing, and demands for housing outweigh the perceived benefits of urban ag projects in most instances. As all analysis indicate, land is the most significant barrier to entry, and cost of land the greatest expense. Effective partnerships models such as the collaboration between the Trust for Public Land, DNI, and Urban Farming Institute can overcome the challenges associated with land acquisition and tenure.

There are 5 newly active Urban Farming projects in the process of being developed:

Bird Street, Upham's Corner

- 10,700 Sq.Ft.., Vacant for 23 Years
- Department of Neighborhood Development Property
- Community Meeting in Progress

Tommy's Rock, Dudley Square

- 8.800 Sq. Ft., Vacant for 30 Years
- DND Property Sold to Trust for Public Land (June 2014)
- Pre-Development Stage

Garrison Trotter, Roxbury

- 12,700 Sq. Ft., Vacant for 30 Years
- DND Property Sold to Trust for Public Land (June 2014)
- Construction and Development Phase

Flint Street, Mattapan

- 13,800 Sq. Ft., Vacant for 27 Years
- DND Property
- Community Meeting in Progress (November 2014)

Ballou, Morton Street

- 20,000 Sq. Ft.
- Codman Square Neighborhood Development Corporation
- Pre-Development, Closing Underway (Winter 2014)

There are a vast range of impacts and indicators which could be measured and correlated to urban farming programs, and the purpose and functions of urban farming vary from region to region and city to city. In Boston, the goal of urban farming projects is not to provide a substantial quantity of produce, but to improve community space and develop local human capital. Chicago has a similar approach, leveraging urban farms not only for improving access to healthy food options, but mainly for decreasing violence and lowering the stress of community residents.

"We don't delude ourselves that we're solving the food desert problem. It's to use food as a tool to change individual lives and to change community."

~ Harry Rhodes, Growing Home's Executive Director (Kotlowitz, 2012)

References

Economic	Data and References	
	Food Produced	(Vitiello) (Haberman) (University of Missouri Extension) (Ganguly) (Kobayashi)
	Employment	(Tichenor, Case Study: Urban Agriculture in Kansas City) (The Conservation Law Foundation) (K. L. Colasanti) (Conner) (Kobayashi) (Metcalf)
	Housing and Property Values	(Nugent) (Mironova) (Loh) (Ober Allen) (Teig) (SPUR) (Voicu) (Gateway Greening)
	Decreased Foreclosures	(Housing and Urban Development) (Thaden) (Loh)
	Job Training and Skills Development	(T. D. Glover) (Kerton) (Ober Allen) (Travaline)
	Food Miles (Transportation Costs)	(Bently) (Brodt) (Carlsson-Kanyama) (Heller) (J. Hendrickson) (Pirog)
	Small Businesses and Entrepreneurship	(Kobayashi) (Bradley) (White) (Bregendahl)
	Healthcare Costs	(Anne Bellows)
	Multiplier Effect	(Moretti)
Social		
	Creating Community Spaces	(Kotlowitz) (Bradley) (Ober Allen) (Teig) (Saldivar-Tanaka) (Bregendahl)
	Educational Benefits	(Tichenor, Case Study: Urban Agriculture in Kansas City)
	Diverse Community Interactions	(T. S. Glover) (Travaline) (Levkoe) (Sumner) (Beckie) (Krasny) (Armstrong)
Environmental		
	Waste Disposal and Landfill Expenses	(Brodt)
	Stormwater Management	(Levy)
	Air Quality	(Bently) (The Conservation Law Foundation)
	Production and Packaging	
	Composting and Natural Nutrient Supply	(The Conservation Law Foundation)
	Urban Heat Island	(Ackerman)
Health		
	Access to Healthy Foods	(Allison Hagey) (Anne Bellows) (Katherine Alaimo) (Deike) (The Conservation Law Foundation) (Armstrong) (Balmer) (Corrigan) (Kobayashi) (McCormack)
	Food-Health Literacy	(Ober Allen) (McCormack) (SPUR) (White) (Levkoe)
	Physical Interaction and Activity	(Armstrong) (Saldivar-Tanaka) (Twiss) (Teig)

Policies, Laws, and Incentives

Existing literature can offer insight on best practices in urban agriculture in cities across the U.S. (University of Missouri Extension). Preliminary research has indicated that best practices in urban ag will be specific to the communities in which they are accomplished (M. P. Hendrickson). Boston is amongst the green elite, ranked the 3rd greenest city in the U.S. (Network) and 4th in the nation for best food access (Deike). It also ranks 3rd nationally on TPL's own ParkScore index (The Trust for Public Land). The political context of the city is welcoming to healthy, green, eco-friendly sustainable cities.

The advancement of urban ag policies at the local and state level will further strengthen Boston's economy, improve the vibrancy of the urban ag sector, as well as redevelop blighted neighborhoods and empower their residents.

Current Context

National policy is not the forum for urban agriculture at this time. By nature urban ag is a local impact strategy and most policy goals and solutions will be found at the state and local level. Few states have opted for statewide initiatives, and those that have mainly promote healthy food access in underserved areas. Since this research is not focused on healthy food access in particular, those policies are not outlined herein.

States of particular interest to our work are California and Missouri, as they have both established *Urban Agricultural Zones*. In terms of taxation, New Jersey and Maryland's state policy tackle this issue well And, Hawaii, New York ,and Texas address funding for capital costs and operations (National Conference of State Legislatures, 2014).

In Boston during the Menino Administration, urban agriculture became a strategic priority for local food access. This agenda resulted in the establishment of the Mayor's Office of Food Initiatives in 2010. A primary objective of the Office is to "expand Boston's capacity to produce, distribute, and consume local food through urban ag and distribution models to supply schools and local businesses" (City of Boston, 2015). In 2013, this office championed Article 89's passage as Massachusetts' first modern "right-to-farm" law.

When the new Boston Mayor Marty Walsh began in office in January 2014, he had the privilege of opening the first urban farm in the city under the new law—TPL's Garrison-Trotter Farm (The Trust for Public Land, 2014). He also changed the strategic focus of the Mayor's Office of Food Initiatives toward a "different direction," said his press secretary Kate Norton (Ryan, 2014). The Office continues to address food access and hunger, its work now focuses more heavily on "supporting restaurants and food trucks serving as an entry point for small business" (Ibid). While the focus of the new administration maybe on the food truck enterprise, small farms, which are also small businesses, may be able to capitalize on this strategy. Especially since they address food access and also double as an economic development tool.

Article 89 - Zoning Overlay in Boston

The City of Boston's Article 89 states that up to one acre farms are permitted everywhere in the city and over one acre in industrial areas (City of Boston, 2013). Further opportunities allowed under Article 89 in Boston, not explored in the scope of this research in response to the client's focus on ground-level farms, are large-scale industrial models such as a wholesale aquaculture farm or intensive hydroponic growing.

These may be lucrative commercial enterprises and require further exploration. Though, in additional to their high upfront capital expenses, large-scale commercial sites do not offer some of the same socioeconomic benefits of the visually appealing ground-level farms discussed throughout this research.

Through this zoning regulation change, the City signaled that it cares about this field and that the administration feels urban agriculture is a good use of city land. Boston is among several large cities, such as Cleveland, OH; Seattle, WA; and Madison, WI that have chosen this overarching policy solution to urban agriculture (Goldstein, 2011).

Does this mean that the best use of land in the face of scarcity is a dozen one acre farms sprinkled across the city? Article 89 currently does not allow housing on the same property as urban farm sites. However, it could be that an affordable housing development centered around a half acre farm may be a more politically viable and smarter planning solution in a city with limited housing options for low-income individuals.

Zoning & Tax Incentives

Both California and Missouri, have created more comprehensive zoning policies than the Article 89 overlay currently offered in Boston. These states have created Urban Agricultural Zones, addressing zoning and taxation in one piece of legislation:

California AB 551 (2013) – "Allows a county or city to establish an Urban Agriculture Incentive Zone (UAIZ) for the purpose of supporting local food production and authorizes cities and counties to enter into contracts with landowners who agree to restrict the use of their land for a minimum of five years for small-scale agricultural production. Landowners then have their land assessed at a lower rate based on the average per-acre value of irrigated cropland in California. A city or county with a UAIZ program may establish regulations for implementing and administering the program, including assessing a fee to cover the cost of the program and cancelation fees for exiting a contract early" (National Conference of State Legislatures, 2014).

Missouri HB 542 (2013) – Authorizes the establishment of urban agriculture zones (UAZ), defined as a "zone that contains an organization or person who grows produce or other agricultural products, raises or processes livestock or poultry, or sells at a minimum 75% locally grown or raised food." Any person or organization may submit an application to a municipality to develop a UAZ on a blighted area of land. The law requires the municipality seeking a UAZ designation to establish a board to advise the municipality in setting up the UAZ and to review and assess zone activities, as well as hold a public hearing on seeking the UAZ designation. Following the conclusion of the public hearing, the municipality may adopt an ordinance designating the UAZ. Real property taxes may not be assessed on any UAZ for 25 years once the application requirements have been met except an amount as may be imposed by the county assessor that is not greater than the amount of tax due and payable during the preceding calendar year during which the UAZ was designated. Requires a grower UAZ to pay wholesale water rates for water consumed on the zone property and pay 50% of the standard cost to hook onto the water source if the water service is provided by the municipality. Requires any local sales tax revenues, less 1% that is to be retained by the Director of the Department of Revenue, from the sale of agricultural products sold in a UAZ to be deposited into the newly created Urban Agricultural Zone Fund. School districts may apply to the State Treasurer for money to develop curriculum on urban farming practices

under the guidance of the University of Missouri extension service and a certified vocational agricultural instructor. The funds are to be distributed on a competitive basis within the school district in which the UAZ is located" (National Conference of State Legislatures, 2014).

Comprehensive Plan

While there is currently no overarching comprehensive plan for urban ag or food access in Boston as there are in other cities like Seattle (click HERE for Seattle's Food Action plan), there is a sub-group of the City of Boston's Department of Neighborhood Development (DND) dedicated to open space, including community gardens, and these interests are shared interagency specifically including the Mayor's Office of Food Initiatives (OFI). Between, DND and OFI, lives the primary support for urban ag in the City of Boston's administration.

At this point there is no formal commitment to urban agriculture as a part of a comprehensive plan. There is also no stated number of desired farms or farms as a percentage of land in Boston communities or city-wide. There is no formula that determines best locations for future urban farms.

As the current process stands, a new entry farmer may start at the Mayor's Office of Food initiatives, DND, CoUrbanize (privately run site to research community development projects), the Tufts New Entry Farm program, or numerous other entry points and each source provides some information—but in a very piecemeal fashion. Funding, available land, RFP on specific opportunities, permits necessary, production resources, crop selection and even farmer training are found in a variety of locations, and no single source comprehensively. The process appears daunting (Knecht, 2015). In order to grow this field, the process should be aligned and simplified.

According to James Smith of Boston's DND, the department use the 2013 Tufts study as a guiding document for determining available land for urban agriculture purposes. They target parcels at least 6,000 sq. ft. and select sites "that make sense" based on the extensive research conducted by the Tufts capstone team to identify appropriate potential farm sites (for more on this report, read the green text box). This usually includes areas with food deserts, increased risk of becoming a food desert, and decreased food access. In the chart above, the two sites; Bird Street and Flint Street were selected because they are "good candidates" (Smith J., 2015). DND seeks community support is an integral part of successful initiation of an RFP for an urban farm in any community. There has been resistance at community meetings, specifically around concerns that farms will further blight a neighborhood.

An informal interview with James Smith, Senior Project Manager on the proposed Bird Street Urban Farm provided

Urban Farming in Boston: A Survey of the Opportunities

This Tufts University study is a comprehensive report compiled by a graduate school team that assessed which publicly available plots of land in Boston are suitable for urban agriculture.

This is a seminal document, particularly as the field continues to grow and the city's support strengthens. With this information, the city now has a choice in how to use the available land for maximum efficiency. This report was commissioned by our client, TPL, in 2013 (Chin, et. al.,

insight on the selection of a site and developer for an Urban Farm (Smith J. , 2015). He states that often site selection occurs from an outside party who voices interest to DND either through the website or a phone call and this initiates the process of putting the land out for development (Ibid). The City itself does not have a database for searching urban farm opportunities, however they have collaborated with the Cambridge civic engagement startup, CoUrbanize to showcase development projects within the City. This interface is user friendly and presents a simple format to see current status and available parcels seeking urban farm RFPs (CoUrbanize, 2015).

Each Request for Proposal (RFP) seeks: 1.) "a developer to redevelop the sites into a healthy, safe, productive urban farm" in compliance with Article 89 *and* 2.) a farmer or farming organization to manage and operate the site. There is no preference toward a nonprofit vs. a for-profit entity in regards to winning bids, only the ability to operate a farm in the short and long-term must be demonstrated. Additionally, a long-term restriction is placed on the sale, stipulating that the land be used for urban farming for a specified time frame, at least ten years. Therefore, if the land were sold the restriction would remain.

Selecting Sites for Future Farms (Figure 15):

Urban Farm Projects - 2014-Present *City of Boston, Department of Neighborhoods Development (DND)*				
	Neighborhood	**Lot Size**	**Disposition Stage**	**Developer**
Garrison Trotter Urban Farm	Roxbury	12,669 sq. ft.	Sold	Trust for Public Land
Tommy's Rock Urban Farm	Roxbury	8,762 sq. ft.	Sold	Trust for Public Land
Ballou Urban Farm	Mattapan	19,970 sq. ft.	Closing Underway	Codman Square CDC
Flint Street Urban Farm	Mattapan	13,821 sq. ft.	Community Meetings in Progress	none
Bird Street Urban Farm	Roxbury	10,718 Sq. Ft.	Community Meetings in Progress	none

Source: www.courbanize.org

* * *

Enacted state legislation in Illinois has made urban farms part of the comprehensive plan context:

> **Illinois HB 1300 (2007)** - "The Illinois Food, Farm and Jobs Act, established the Local and Organic Food and Farm Task Force. The task force will develop policy and funding recommendations for expanding the state's local and organic food systems. The task force will examine opportunities to increase local food production, identify legal impediments to local food production, identity

land preservation, and acquisition opportunities for local and organic agriculture in suburban and urban areas, and identify means to expand urban agriculture training programs, among other provisions" (National Conference of State Legislatures, 2014).

This is also true in Louisiana:

> **Louisiana HB 840 (2010)** – "Created the Louisiana Sustainable Local Food Policy Council to consider a number of policies, including analysis of how best to promote urban and backyard gardens, evaluation of the effects of sustainable local food production on economic development, identification of local and regional efforts that provide information and training to entrepreneurs and local farmers who are pursuing sustainable local food economic development opportunities, and identification and development of solutions to regulatory and policy barriers that inhibit sustainable local food economies among other provisions"(National Conference of State Legislatures, 2014).

Having the resource of the 2013 Tufts land inventory provides a starting place for a more formal municipal *land use map* (Mendes, et. al. 2013). Boston can take lessons from other large cities providing single source databases for urban agriculture information. This model has been adopted in Minneapolis, who shares a site with the city of St. Paul: *www.tcurbanag.com*. They have also established a site for best practices database for all cities to utilize, through the University of Missouri: http://extension.missouri.edu/foodsystems/urbanagriculture.aspx. Pittsburgh, PA also has a single source for information: www.growpittsburgh.org/.

Access to Capital

A known barrier to urban agriculture is access to capital. Federal agricultural funding streams are for large scale farms, specifically over 5 acres. In 2013, USDA began a microloan program that can be utilized by urban farmers (Agriculture, 2013). However, existing federal community programs, such as Community Development Block Grants (CDBG) may provide nonprofit models funding opportunities depending on how they approach urban agriculture enterprises. The Massachusetts Department of Agricultural Resources links to funding options, however none of these options offer enough capital to cover start costs (see figure 16 on the following page).

Additional grant and loan information can be found on the City of Boston's website and a snapshot of those opportunities are in Appendix 1.

Examples of policies that provide access to capital at the state level include:

> **Texas – HB 2994 (2011)** Texas Agricultural Authority established urban farm microenterprise support program which supplies loans to expand, renovate, improve, and establish new urban farm microenterprises (National Conference of State Legislatures, 2014).
>
> **New York - SB 614/AB 1389 (2011)** Provision of financing for the transportation and distribution of New York state farm grown products to food service markets, including restaurants, schools, colleges, and others, especially in underserved urban and other communities, as an eligible activity for grants and loans (National Conference of State Legislatures, 2014).

Figure 16:

Government Funding Sources for Urban Agriculture in Boston					
	RFP Cycle	**Minimum Plot size**	**Limitations**	**Grant size**	**Purpose**
Agricultural Environmental Enhancement Program (AEEP)	June 5, 2015 deadline	No minimum	all land in proposal must be under same ownership	Up to $25,000	Reimbursement of installation of conservation practices that prevent direct impacts on water quality, ensure efficient use of water, as well as address impacts on air quality.
Agricultural Food Safety Improvement Program (AFSIP)	June 17, 2015 deadline	No minimum, preference to those that address significant food saftey concerns	Must be in good standing and preference to CQP participants or GAP audited*	Up to $20,000	Supports agricultural operations that are looking to upgrade their food safety measures and thereby maintain or increase their competitive market access while reducing food safety risks. Includes hand washing sinks, drainage systems, restrooms and water systems.
Farm Viability Enhancement Program (FVEP)	June 23, 2015 deadline	5 acres (total)	Capital is in exchange for an agricultural covenant on the farm property for a fixed term of 5 or 10 years .	Up to $20,000 for a 5 yr covenant, or $40,000 for a 10 yr covenant	To improve the economic viability and environmental integrity of participating farms through the development and implementation of farm viability plans (incl. feasibility studies of potential enterprises, business plans and environmental plans).
Matching Enterprise Grants for Agriculture Program (MEGA)	late June 2015	None	Limited to farms in years 1-5 of operation, receiving this means cannot apply for FVEP and vice versa	Maximum $10,000	With matching funds and business planning assistance, to assist new farmers develop their farms into commercially viable operations. Individual business planning, technical assistance and financial assistance for equipment, infrastructure or other capital improvements.
MDRA - Urban Agriculture Program	Not yet announced	None	Urban farms		
* Commonwealth Quality Program (CQP)/ Good Agricultural Practices (GAP).					

Tax Incentives

The property taxes in Boston are not strictly based on current use, thus property tax policy currently penalizes those trying to advance urban agriculture by not allowing their land to be valued an the agricultural rate. Incentivizing farming is the logical next step to reducing the costs of urban farming (Rushlow, 2015). This is necessary to allow for the economic viability of small for-profit urban farms.

The following bills are supported by the Massachusetts Farm Bureau (MFB) and are under consideration for the 2015-2016 legislative term, in hopes of offering much needed support to Boston's urban farmers:

> **HD 1584** - An Act relative to tax credits for agricultural land sponsored by Representative Schmid. This act would change the qualifying threshold for 61A to allow for parcels of less than 5 acres to be protected under 61. The MFB states that "the Commonwealth has seen an approximately 30% increase in the number of farms in the last decade – many beginner farms on small parcels." HD 1584 would increase the financial viability for and promote sustainability of small urban farms.

SD 1315 - An Act relative to exemptions from taxation of structures and buildings essential to the operation of agricultural and horticultural lands sponsored by Senator Donnelly. Hand Washing facilities, sheds for storage of tools and supplies, as well as other farming structures are equally as important to a successful farm. MA law ensures that land is taxed appropriately for agricultural activities (if they are covered by the protections of MGL Chapters 61 and 61a). However, many farms are finding their buildings are taxed disproportionally to the income – often seasonal – generated on their operations. Farm stands are often taxed at the same rate as commercial office space and other high-value commercial spaces. SD 1315 proposes a time-limited exemption from property taxes in order to protect farms and make it more feasible for farmers to invest in infrastructure; Summary from: (Federation, 2015).

Taxation is not a burden to all legal structures, as previously noted, nonprofits are tax exempt and this has created faster roads to self-sustainability in some cases. Lydia Sisson, Co-Director of Mill City Growers in Lowell, MA states they are in entering their fourth year and they have already surpassed their break-even point (Sisson). Community Land Trusts, as nonprofit legal structures, are also tax exempt, further enabling urban farmers growing on CLTs to become self-sustaining.

In an interesting sweeping legislative action, the state of New Jersey, not only permitted urban farming, but authorized the sale or lease of **"**unneeded public property to nonprofits for gardening and urban farming. Exempted such urban farms from property taxation and authorized such nonprofits to sell fresh fruits and vegetables on the leased land, off the leased land, or both under certain conditions" (National Conference of State Legislatures, 2014).

Baltimore, Maryland in HB 1062 (2010) "Authorizes the Mayor and City Council of Baltimore City or the governing body of a county or of a municipal corporation to grant a tax credit against the county or municipal corporation property tax imposed on specified urban agricultural property. Authorizes the county or municipal corporation to provide for the amount of the credit, eligibility criteria, regulations and procedures, and other provisions necessary to carry out the credit" (National Conference of State Legislatures, 2014).

Highlight on Washington, DC

Washington, DC is considering an act that proposes tax abatements and incentives. Why? Because, as of the summer of 2014…

"Despite all the buzz about growing food in the city, only a handful of for-profit businesses are break-evening in urban agriculture. The Sustainable DC Act includes a goal of putting 20 additional acres of land in the city under cultivation for growing food in the next couple of decades" (Pipkin, 2014).

With property taxes at $25,000/year per acre, urban farms can only afford to contract out land versus owning it.

"The Urban Farming and Food Security Act of 2014, for example, would establish incentives for leasing land to farmers in the city and tax credits for farmers who donate their food to local nonprofits. A 50 percent tax abatement on urban agricultural lands is part of the original bill, but urban farmers voiced concerns through an online forum and at a hearing that it would still not be enough to make their operations financially viable" (Pipkin 2014).

DC is engaging its commercial growers in the tax conversation to establish a feasible solution to balancing costs to increase profitability for urban farms within the city. Similar initiatives have been achieved in San Francisco and Baltimore (Chen, 2014).

Community Building

Balancing community interests throughout the City requires an understanding of the problems and effective communication. As noted from the DND interview with James Smith, urban ag stakeholders at community meetings for proposed farms encountered community resistance and concerns of blight. This is reoccurring theme in conversations involving urban agriculture and Boston residents.

A year ago the partnership (Figure 1) was formed in Boston. With farming now legal in the city, this has as Tad Read states "unlocked the land" for future development (Knecht, 2015). Communities have an opportunity to combine their housing needs, food access needs and recreation with open spaces and smart growth priorities. DSNI has seized the opportunity utilizing their CLT model to lease land for urban agriculture to UFI.

Penn Loh, outspoken advocate for the CLT model in Boston notes in his January 25, 2015 article in *Yes Magazine* four major cities successes with protecting affordable housing through the CLT model. His source is a 2011 survey of 96 CLTs which hold 10,000 units of housing:

- **Burlington, VT** - The Champlain Housing Trust; over 2,000 units of rental apartments, single-family homes, and condominiums. This model also incorporates urban agriculture into the CLT's composition.
- **Durham, NC** - Durham Community Land Trustees; 200 units of housing and a community garden.
- **Madison, WI -** Madison Area Community Land Trust - 98 homes and 10 acres of agriculture.
- **Albuquerque, NM -** Sawmill Community Land Trust - 93 affordable ownership homes, three apartment buildings, a playground, a plaza, and community gardens (Loh, 2015).

Highlight on Boston, MA - Communication

On March 20, 2015, in the Municipal Symposium for Urban Agriculture in the "Land: Policy, Availability and Strategy" session with Harry Smith, DSNI; Luisa Oliviera, City of Somerville; Tad Read, BRA and; Kevin Essington of TPL, and Barbara Knecht as the moderator. Participants discussed the need for community buy-in in the urban farming conversation in targeted Boston neighborhoods.

Residents are hesitant because they fear chickens.

"Soil contamination and chickens," says Luisa, "Composters and chickens attract rodents… Rats!"

Tad reiterates, "Fear of rats and chickens, those are issues, some legitimate."
These are city planners, and they are listening.

The conversation flows naturally into other concerns of residents, if the farms don't blight neighborhoods, they gentrify. As previously noted, and economic impact of urban farming is increased property values of the surrounding neighborhood. Affordable housing is already a significant challenge in Boston. Harry Smith recollects the 'Don't Dump on Us' campaign. "How do we stop negative things from happening? … Take a stand own the land." And, that is how community land trusts (CLTs) were born (Knecht, 2015).

DSNI is resident to Roxbury and North Dorchester. For this model to grow in Boston, communication about its possibilities must be shared with other neighborhoods. This can happen through education. Not just through proven youth urban agriculture education models. Not just to the captive audience of farmers in training, or DSNI's client base. And not just to the audience of urban ag literature and presentations, but in the housing conversations, in the neighborhoods, at community meetings advertised by BRA and DND. The model requires community initiative and support to be successful. Cities such as Chicago, Austin and Las Vegas have successfully engaged multiple neighborhoods into forming CLTs (Brown).

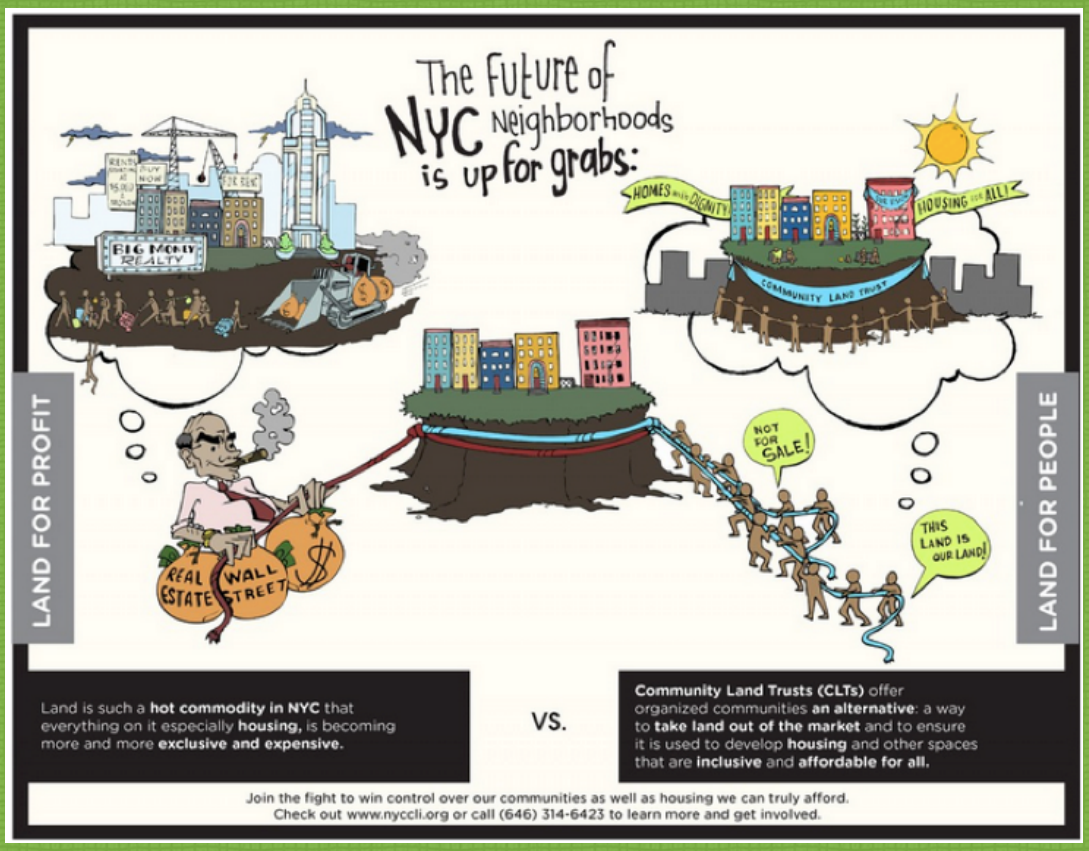
Legislation can play an active role in creating a collaborative landscape with housing and the greening of the city. In a revolutionary step, the state of Hawaii through legislation passed House Bill 560 (2013) which, "Authorizes the Hawaii housing finance and development corporation to provide incentives for the development of housing projects that incorporate urban gardening programs. Requires the college of tropical agriculture and human resources of University of Hawaii at Manoa to be consulted regarding best practices" (National Conference of State Legislatures, 2014).

In Missouri, in an effort to develop sustainable communities, while engaging community support legislation was passed, HB 1848 (2010): "The bill established the Joint Committee on Urban Agriculture. The committee must study and make recommendations regarding the impact of urban farm cooperatives, vertical farming and sustainable living communities and must examine various trends in urban farming; existing services, resources, and capacity; the impact on affected communities; and any needed legislation, policies, or regulations. The committee must hold meetings to seek public input" (National Conference of State Legislatures, 2014).

Highlight on New York City – City-Wide Land Trust

In NYC, Oksana Mironova, housing advocate, promotes a current effort in East Harlem to adapt the "traditionally hyper-local, community-driven CLT model to scale up to the city-wide level" (Mironova).

The movement for CLTs in NYC boasts big name backing like: the National Housing Institute, the Lincoln Institute, Ford Foundation, MacArthur Foundation, and the Federal Reserve. With graphics and media attention that appeals to the residents of the city, people are paying attention (NYCCLI, 2015).



The NYCCLI grew out of several parallel efforts: Picture of the Homeless, New Economy Project, Community Board 11 (East Harlem) and Housing Environments Research Group at the CUNY Graduate Center which convened at the Ford Foundation in 2012 to identify ways to promote the CLT model in NYC (Mironova). The group currently focuses on:

1) **education and outreach, specifically about discourse about the CLT model;**
2) **policy and legislation, defining CLT as a policy agenda;**
3) **governance, developing governing structure framework for equitable, and sustainable CLTs; and,**
4) **a pilot project group in East Harlem.**

Ultimately, they seek a commitment from Mayor DiBlasio to the CLT model. Commitment for its address of civic involvement, gentrification and long-term housing affordability (Mironova).

References

Policy	Data and References	
	Overview of Boston and Current Context	(University of Missouri Extension, 2015) (Hendrickson & Porth, 2012) (Network, 2015) (Deike, 2014) (The Trust for Public Land, 2015) (Green Leigh, 2013) (Pearson, 2010) (The Trust for Public Land, 2014) (City of Boston, 2015) (Ryan, 2014)
	Planning and Zoning	(Chin). (National Conference of State Legislatures, 2014) Legislation: CA-AB 551, MO-HB 542, MA-Article 89 (Sustainable Agriculture Research and Education, 2001)
	Comprehensive Plan	(Chin, 2013)(K. J. Colasanti) (National Conference of State Legislatures, 2014) (Courbanize, 2015) Legislation: IL-HB 1300 (2007) & LA-HB840. (Mendes) (Smith J. , 2015). (Knecht, 2015)
	Tax Incentives	(Chen) (Pipkin) (National Conference of State Legislatures, 2014) (Knecht, 2015) (Rushlow, 2015) Proposed Legislation MA SD 1315, MA-HD 1584. Enacted Legislation: MY HB-1062, NJ AB-2859
	Communication	(M. P. Hendrickson) (K. J. Colasanti) (Smith J. , 2015). Pittsburgh: (Pezzino, 2014)
	Access to Capital	(National Conference of State Legislatures, 2014) (Agriculture, 2013) (Knecht, 2015) (Resources, 2015)
	Sources for Best Practices	(M. P. Hendrickson) (Goldstein, 2011)
Sustainability		(K. J. Colasanti) (Mendes)
	Resilient Cities	(Pearson) (Veenhuizen, 2007)
	Community Land Trust (CLTs)	(Mironova) (Loh) (Southside Land Trust) (Homestead Community Land Trust, 2014) Legislation: MO-HB 1848, HI HB-560

Key Findings and Recommendations

Urban farming is on the rise across the globe. Economical solutions when land is scarce suggest that innovative urban farming projects which maximize available land resources will be the most successful models for sustainable urban agriculture.

Pathways to Profitability

It is of vital importance that an urban farmer launching a new business be very familiar with the legal, regulatory, and permitting processes they will need to complete before launching their enterprise. It is highly advised that the potential business owner consults with qualified legal and financial experts to ensure that their business will be off to a great start. Additionally, it is important to note that launching an urban farm can carry extremely burdensome start-up costs. Therefore, savvy fundraising and cost saving strategies must be explored as they relate to all major costs; land, soil, water, equipment, etc. Many of the cost saving strategies are linked to policy recommendations that are outlined in the Pathways to Profitability and the Policy sections of the paper.

The community land trust model is highly advised to ensure land stability and securing for farmers and also to stabilize the communities around them and stave of gentrification.

In addition of these capital costs and concerns, crop selection is critical to ensuring a sustainable commercial urban farming enterprise. High-yielding and high-profit margin crops like garlic and greens should be grown and the land used should be optimized. The preferred distribution channel should be to restaurants, since the research has found this to be the most reliable source of income.

By investing in a value-added product such as wine grapes can help offset the high capital costs. By using high-profit margin crops like wine grapes to complement other vegetables and fruits, an urban farm can become economically sustainable and ultimately turn a profit. Craft breweries have taken the area by storm, and the next frontier is urban wineries where producers can take a product from the ground to the table all in the very same location.

Recommendation: *During the start-up phase, local urban farmers must select the best legal structure for their urban agricultural enterprise, mitigate start-up costs, and ensure land security. In addition, they must select high profit yielding, ground-level crops suited to our geographic location to achieve financial sustainability.*

Economic & Community Impacts

The full range of community benefits as a result of urban farming operations are not clearly identified or qualified in one comprehensive research document or data collection toolkit. The research in this document sought to initiate this process and began to identify the metrics and data collection methodologies required to develop a full understanding of urban agriculture's impacts. The research noted some negative outcomes such as changes in population demographics and trends in gentrifications, but other unintended consequences are not thoroughly explored. The potential negative implications should be assessed and documented alongside benefits in order to assure that a proper and full evaluation is achieved.

To fully measure the impacts of urban farming operations and activities, three data collection mechanisms are needed. As described in the Measuring Benefits section, a Farm Operator survey and data collection tool should be deployed to solicit information on the farm's area, production capacity, employment and sales, and other general site-specific programs, events and infrastructure. A second survey tool should be shared with a sample of community residents to gauge demographic information, assess health and social habits, and evaluate participation and time-related data. Finally, it is recommended that an independent evaluator be hired, either by TPL or a consortium of urban farming operators, in order to develop some metrics for assessing farms across the city. The independent evaluator would be able to quantify information which is out of the capacity of most farm operators to collect, including census and community demographic info, community participation rates, health and eating habits, and production/employment/entrepreneurship effects.

It is recommended that TPL either seek to formalize the tools as drafted, either independently or in collaboration with BARN and Farming Concrete. The farm operator data collection tool can be implemented with support from UFI and TPL's future partners on urban agriculture projects. As data are collected through these portals, it can provide a context for establishing monetary values of urban agriculture impacts. As the impacts of urban agriculture, such as employment, education, and healthy eating are quantified, the City and affiliated partners can prepare more accurate cost/benefit analyses to determine when and where urban farms will have the greatest beneficial effect.

Recommendation: *TPL and/or the City should revise and implement a set of data collection tools for urban farm sites to monitor effects and impacts on the community.*

Policies, Laws, and Incentives

A formal urban agriculture plan, which dedicates an explicit number of ground level farms not only as part of food access, but for its importance to urban design, is necessary in order for interested stakeholders to ensure existence of future farms. Incorporation of a formal commitment to urban agriculture into neighborhood planning at a municipal level would allow the city to equitably disperse the opportunities for maximum utilization, without assuming an opportunity cost where private investment would be the best use of the land.

Communication with all relevant stakeholders within a community is essential. If Urban Agriculture wants to expand in Boston, they need to be at the table whenever the opportunity arises. CoUrbanize is a platform DND is utilizing to create community awareness for open meetings. Urban agriculture representation needs to be present to address resident and community stakeholder concerns. This will be instrumental in building support for industry growth. In the Bird Street community meetings, DND and other City staff were left to defend the merits of urban agriculture without any representation from the urban agriculture constituency. Furthermore, support of legislation at the state of city level that will minimize private investment taxation on urban agriculture should be supported by all stakeholders.

The process of obtaining land and then the numerous permits to utilize the land needs to be streamlined. Not only should there be one entry point for all permits water/sewer/drains/building permits/fences and other site alterations, but the process could be expedited through a "urban farming permitting process." Harvard University has prepared a 56 page manual solely for a permitting process of setting up a one acre farm in Boston . The commitment from BRA and DND has yet to be matched by other municipal departments who are also stakeholders in the urban agriculture conversation.

Interdepartmental collaboration must occur to smooth the process for new farmers who would otherwise be dissuaded to participate by the daunting process.

The Community Land Trust model presents as a viable and attractive solution to seemingly conflicting agendas in the Boston context. Awareness for the model's strengths and benefits needs to be shared with and realized by communities that can benefit from this alternative and which can provide for additional greening the city and affordable housing.

Recommendation for client action*: Support and advocate for proven models, such as the Community Land Trust model, that champions TPL's mission and shares a dual objective with Boston based stakeholders in the smart growth, economic development, and housing conversations.*

Recommendation for municipal action*: Establish a formal urban agriculture policy; this should be supported by an urban agriculture land use plan, resource database, tax incentives, education, and a single organizational contact for urban agriculture matters.*

Appendix 1

Grants

SARE Farmer Grant

Farmer Grants are for commercial producers who have an innovative idea they want to test using field trial, on-farm demonstration, marketing initiative, or other technique. A technical advisor - often an extension agent, crop consultant, or other service professional - must also be involved. Projects should seek results other farmers can use, and all projects must have the potential to add knowledge about effective sustainable practices.

USDA Specialty Crop Black Grant Program (SCBGP)

Purpose to enhance competitiveness of specialty crops.

Natural Resources Conservation Services (NRCS) Conservation Innovation Grants (CIG)

Funding opportunities for agriculturists intending to adopt innovative conservation approaches in conjunction with agriculture production.

Matching Enterprise Grants for Agriculture Program (MEGA)

The Matching Enterprise Grants for Agriculture Program (MEGA) seeks to assist new and beginning farm businesses with startup or expansion costs. The Program offers technical and business planning assistance to support the special needs of beginning farmers. It also makes available financial assistance for equipment, infrastructure or other capital improvements needed to implement strategies recommended through the planning process.

APR Improvement Program (AIP)

The purpose of the APR Improvement Program (AIP) is to help sustain active commercial farming on land that has already been protected through the Department's Agricultural Preservation Restriction (APR) Program. AIP provides technical assistance and business planning to improve farm productivity and profitability with the goal of enhancing the significance of the APR farm operations and their contribution to the state's agricultural industry. The program provides assistance to enhance the long-term continued use of the agricultural resource, which may include economic viability, environmental sustainability, resource conservation, family succession planning, infrastructure improvement, or other issues.

Farm Energy Discount Program

The Farm Energy Discount Program provides discounts on electricity and natural gas bills of 10% to eligible entities engaged in production agriculture. Subject to certification by the Massachusetts Department of Agricultural Resources ("MDAR" or "Department") persons or corporations determined to be principally and substantially engaged in the business of production agriculture or farming for an ultimate commercial purpose will, upon written application, be eligible for a ten percent discount on rates.

Microloans

USDA Microloan for Beginning Farmers and Ranchers.

Carrot Project
Small farm loan program, loans from $3,000-$35,000.

Accion
Small business loans for business owners who cannot borrow from the bank.

Brewing the American Dream Fund
Loan program for female entrepreneurs.

Massachusetts Growth Capital Corporation (MGCC)
Connecting new entrepreneurs with micro lenders and hosts a loan program for loans over $100,000.
Contact: Jose Luis "Pepe" Rojas at 617-337-2815

Sprout Lenders
An investment club, where members pool their funds and accept applications for loans up to $5,000 for start-up businesses.

Cooperative Fund of New England (CFNE)
Range of loan products for cooperative, nonprofit's serving basic human needs, employee owned businesses and co-housing developments and community land trusts.

Fair Food Fund Northeast
Provides patient loans, royalty financing, and equity capital to growing food enterprises in the Northeast.

Shade Fund
Provides loans of up to $50,000 for new entrepreneurs that are looking for responsible ways to put natural resources to work.

Mass Development Agriculture Loan Program

Loan program to help small farmers and food system businesses in Massachusetts finance projects that improve their operations and increase their income.

http://www.cityofboston.gov/food/urbanag/support.asp

Appendix 2

Economic

Food Production

Food production is the main source of income for most urban farm entities. With Article 89 in Boston, food can be produced and sold on an urban farm site directly, or sold through retail partners or farmers market events. CSAs are popular revenue streams for the distribution of produce, as well as direct sales to restaurants and food production businesses. Specialty crops and the processing of consumer goods from raw produce also provides revenue through higher-priced value-added products (see Crop Selection and Techniques).

Employment

The number of community residents employed or receiving compensation for their efforts depends on variables such as the size of the farm, organization of the business and entity, and crop selections and growing seasons. Generally urban farm jobs in the northeast region are seasonal, with nearly zero employment during winter months unless greenhouses or other facilities are utilized. TPL has estimated that the farms will require 1 staff at a salary of $12,000 per year, with administrative support for $2,500 per year.

Housing and Property Values

Within most land-starved cities, access to property is the most significant cost and barrier to entry for urban farming projects. Where housing markets are already pressured by increased rents and exceedingly low vacancy rates, as in cities like Boston or New York, urban farms can lead to increased property values which, if not addressed from the outset, can lead to gentrification and pricing-out of historical neighborhood residents. While increased property values can be beneficial for the community if property ownership is high, and adds to the city's coffers through higher tax revenues, the impacts can be detrimental to tenants who may not have secure rights or tenancy agreements (as addressed in the Pathways to Profitability section). Research studies of community gardens in New York City showed that residential property values increased by as much as 9.5% in five years in low-income neighborhoods (United States Environmental Protection Agency). Another study, conducted in the New Kensington neighborhood of Philadelphia, PA, showed that the improvement of vacant lots increased the residential property value of the neighborhood by 30% (Housing and Urban Development).

Decreased Foreclosures

Foreclosures in many communities due to the 2008 housing recession created vacant properties and lots which are suitable for urban farming projects (Housing and Urban Development, 2014). In order to ensure that development efforts incorporate and benefit the sustaining community members, a Community Land Trust (CLT) can be formed. CLTs offer a democratic and public entity for supporting local residents with stable and affordable housing. Successful urban farm projects are initiated and/or supported by CLTs in communities with high foreclosure rates to provide income to local staff in addition to low-cost produce (Thaden, 2010).

Job Training and Skills Development

The training opportunities for urban farming sites provide neighborhood residents with skills in farm management and crop growth. Training courses can include business and operations management content, in addition to hands-on field instruction. While training and development programs generally

supply only a minor percentage of an organization's revenue, they allow community residents to gain valuable professional experience.

Involving youth in urban farming is an economic benefit. Growing Power in Milwaukee leverages 14 green house over 2 acres and feeds 10,000 people. The social return on investment is evident through their work readiness program, developing youth's construction techniques and writing skills, providing summer work for convicts, and resulting in a reduction of neighborhood crime (Gunther, 2010 ; Liborio).

Community Groundworks in the Somerville/Lawrence communities have been working to define measurable outcomes for long term impact for these programs on economic development. This addresses the impact on youth as producers vs. consumers and capitalizes on the lessons of responsibility and productivity (Massachusetts Urban Farming Conference).

Food Miles (Transportation Costs)

Locally produced food can supply communities with healthy options which travel less miles from "farm to plate". Urban farms can leverage dense communities and high demand by reducing the need for transportation over a few blocks from the site. This also provides security in food access, diminishing the potential for disruptions to the supply chain. The US increasingly imports fruits and vegetables, up from 21 percent and 4 percent respectively in 1970 to 45 percent and 17 percent in 2008 (Roeger and Leibtag). While the MA climate is unsuitable for outdoor growth of many types of fruits and vegetables, some savings can be identified by removing the distance between the farms and consumers. The efficiencies are dependent on the farm's crop selection and market sourcing and prices, and thus difficult to measure. Additional research is needed to identify seasonal prices and food miles traveled for crops which the farms are growing. The difference in emissions to transport a locally-grown tomato as compared with one grown across the country (over 3,000 miles) can be as high as 50 percent, however this value varies greatly based on the crop, region, and growing season.

Small Businesses and Entrepreneurship

The availability of community farming space enables small businesses and entrepreneurial enterprises to utilize financially and geographically accessible plots for agriculture-related products and services. By processing raw produce to consumer goods, or providing training or educational services, subsidiary or affiliated enterprises can be formed and supported. Many urban agriculture projects are located in areas where unemployment is high and farms can serve as creative revenue streams (Golden).

Healthcare Costs

Research has indicated that as people become more involved in the production of food, they will be more likely to consume healthy options (Anne Bellows). By instilling a value of healthy food habits, urban farms can support community health. Monetizing this benefit will prove difficult, as one must measure the pre/post consumption rates and eating patterns of community residents and compare these changes with current research in health and nutrition. The value of preventative measures such as healthy eating are well understood and can be evaluated, however this would require a longitudinal study of a sample of residents.

Multiplier Effect

Locally produced and consumed food will keep more money in the immediate community than fruits and vegetables purchased through traditional large-scale grocers. Grocers source produce from out of state and out of country, and a portion of the flow of revenue from a grocery store will travel out of the community and region. By producing and selling produce in the community, almost the entire portion of

revenue will stay within the area. The local multiplier effect describes the power of 'buying local', and can be evaluated by developing an understanding of consumer spending patterns and retail sourcing markets (Moretti).

Social

Creating Community Spaces

Urban farms can revitalize neighborhood dynamics and create safer streets, resulting in more positive associations and community well-being (Bradley; Ober Allen). Community agriculture sites encourage residents to maintain the property and surrounding area. Where vacant lots are subject to be vandalize or otherwise abused, urban farms create safe and value-generating benefits.

Educational Benefits

Urban farming enterprises can provide numerous educational benefits for both youth and adults. Professional training in agriculture and administrative programs for business operations can make use of staff's intellectual capital. All age groups are able to engage in hands on training, and farming operations can develop programs to teach business development operations and financial management.

Diverse Community Interactions

Community health is the social and economic capacity of a community to create an environment that sustains the visions, goals and needs of its residents. The social organization required for most urban farming projects can forge stronger community bonds by creating 'stakeholder interactions' that give individuals a sense of responsibility and productivity. By harnessing two sources of capital — social capital and the existing built environment — urban farming uses the inherent strengths of cities to solve some of their most serious problems. Urban farming sites allow residents to build trust and engage in mutually beneficial activities together (Armstrong).

Environmental

Waste Disposal and Landfill Expenses

In traditional modes, up to 40 percent of food grown on industrial agriculture farms goes to waste (Jones, 2006). Reductions in waste from urban agriculture are primarily a result of less packaging materials. Composting of food waste can help to decrease the need for refuse pickup and disposal, a costly service in urban settings. About 20 percent of municipal waste is compostable and urban composting provides both a disposal for food waste and rich soil material (Ackerman, 2012).

Stormwater Management

The infiltration of water into the natural environment provides many benefits including natural filtration and reduced runoff into storm-water infrastructure. Paved surfaces carry runoff and contaminants either to drainage outlets in public waterways or water treatment facilities. Boston has about 85 percent separated sewer and storm drain systems, however combined sewer overflows (CSOs) account for over 230 miles of the total 1,450 miles. During a storm event, a CSO can discharge sewage and storm runoff into the Harbor or tributary waters. By reducing the overall flow in the CSO systems, urban farms can help to prevent and reduce the impacts of combined sewer overflow events.

At a cost of $0.0085 per gallon for sewer service and $0.0048 per gallon of clean water, the savings to individual property owners are minimal. A 10,000 square foot property in Boston will have about

275,000 gallons of rainfall per year. If all rainwater is captured and used for crop growth, the equivalent annual cost for municipal water would be approximately $1,320.

Air Quality

Urban areas have generally poor air quality in industry or traffic-heavy areas. Vacant lots which are transformed into urban agriculture sites can both filter pollutants and reduce ozone concentrations by providing lower air temperatures. A study in Toronto found that an acre could on average remove .03 metric tons of air pollutants per year (Knizhnik).

Production and Packaging

Urban farming operations are able to minimize the amount of waste used in the life cycle of the crops by cutting down on processing and production materials and time. Crops can move quickly from the soil to consumers with minimal need for disposable packaging. Almost all of the processes and materials involved in urban farming can be reused or recycled, including materials needed in the processing and storage/packaging of foods prior to sale (Pullman). Special packaging and chemical additives are required for crops that are shipped long distances (to preserve physical appearance and adjust ripening), however it is likely not possible to source such specialty crops locally without advanced greenhouse facilities (Knizhnik).

Composting and Natural Nutrient Supply

Soil and nutrient procurement and production can make up one the largest expenses that an urban farming operation must incur in regular intervals (Surls, Borel and Biscaro). Adding compost to soil can increase the infiltration rates of water (which can help to prevent runoff during a large storm event), provides nutrients to plants, and offers a way to reduce food waste disposal to landfills. The nutrient costs for small-scale urban farms are minimal (between $10-50 per year), and soil erosion generally is lower than on traditional large-scale farms (Buman). By 'closing the loop' between food waste produced on site and materials needed for improving soil quality, composting (or other sustainable life cycle processes such as aquaculture) can reduce the environmental burden of food production activities.

Urban Heat Island

Urban environments are generally paved surfaces which absorb and store large amounts of solar energy. The rate at which urban heat islands increase the air temperatures in the surrounding area depends on the types of materials used and construction of the landscape. The effects of urban heat include increased use of energy for air conditioning and elevated instances of asthma and heat-stroke (Ackerman). Urban agriculture sites and rooftop gardens can absorb a portion of the solar irradiation and diminish the impacts of heat storage from paved surfaces.

Health

Access to Healthy Foods

The US has seen a rapid increase in diet-related diseases including diabetes and obesity. Access to high quality foods is critical in supporting healthy communities. Urban agriculture sites have proven to increase fruit and vegetable consumption of participants, and those connected to the farms are 3.5x more likely to eat 5 fruits or vegetables a day compared with someone who was unconnected with the farm (Ober Allen; McCormack). Neighborhoods with farmers markets have higher fruit and vegetable consumption rates among people of color, and particularly in low-income areas where food subsidy

payments can be used for produce (McCormack). CSAs are also popular modes which support greater consumption rates and varieties of fruits and vegetables (Golden).

Food-Health Literacy

Food and health literacy is the understanding and appreciation of agriculture, food production, and nutrition. In order to develop a better understanding for the sources of our food and the nutritional value as it effects our health, food literacy initiatives can teach youth about how food is grown, and how healthy eating habits can improve health and wellbeing. Raising awareness of the food system and proper diet can help support healthy lifestyle choices and habits for youth in particular (SPUR; White; Bregendahl). Increased awareness of food access, diet and nutrition can promote healthy cooking and eating practices which can result in lower future health risks. Farms also provide a pathway for youth to talk about healthy habits, which can reinforce their actions (Golden).

Physical Interaction Activity

Residents who engage in farming can find health and wellbeing benefits as a result of sustained activity. The kinetic movements required for farming can keep youth and adults active and reduce the risk of some diseases and ailments (Armstrong; Teig; Twiss). The physical activity in combination with plants and natural systems can help participants and community residents achieve reductions in stress and improvements in overall well-being.

References

University of Missouri Extension. (2015, January 31). Agriculture Business. Retrieved from http://extension.missouri.edu/main/DisplayCategory.aspx?C=43

University of Missouri Extension. (2015). Food System Tiers. Retrieved January 31, 2015

United States Environmental Protection Agency. (2015). Urban Agriculture: Basic Information. Retrieved from EPA: http://www.epa.gov/brownfields/urbanag/basic.htm

Wallin, C. (n.d.). 10 Most Profitable Specialty Crops to Grow. Retrieved April 19, 2015, from Profitable Plants Digest: http://www.profitableplantsdigest.com/10-most-profitable-specialty-crops-to-grow/

White, M. M. (2010). Shouldering Responsibility for the Delivery of Human Rights: A Case Study of the D-Town Farmers of Detroit. Race/Ethnicity .

Wolvek, J. (2014, December 2). Boston Real Estate Market: Low Inventory and Rising Prices. Retrieved January 31, 2015

Yuen, J. (2014, April). City Farms on CLTs: How Community Land Trusts Are Supporting Urban Agriculture. Land Lines , 2-9.

Veenhuizen, R. v. (2007). Profitability and sustainability of urban and peri-urban agriculture. Food and Agriculture Organization of the United Nations.

Vitiello, D. M. (2009). Community Gardening in Camden, NJ Harvest Report: Summer 2009. Philadelphia: Center for Public Health Initiatives.

Voicu, I. &. (2008). The Effect of Community Gardens on Neighboring Property Values. Real Estate Economics , 2414–2263.

Ackerman, K. (2012). The Potential forUrban Agriculture in New York City. New York: Columbia University.

Adams, D. (2014, December 06). Mass. farmer-wineries decry change to law. Retrieved April 04, 2015, from Business: http://www.bostonglobe.com/business/2014/12/06/massachusetts-farmer-wineries-decry-change-law-legislators-scrambling-fix-mistake-before-jan/AT8gp49QLcMVpOILkn4ZBK/story.html

Allison Hagey, S. R. (2012). Growing Urban Agriculture: Equitable Strategies and Policies for Improving Access to Healthy Food and Revitalizing Communities. http://www.policylink.org/sites/default/files/URBAN_AG_FULLREPORT.PDF: PolicyLink.

Anne Bellows, K. B. Health Benefits of Urban Agriculture. Community Food Security Coalition.

Armstrong, D. (2000). A survey of community gardens in upstate New York: Implications forhealth promotion and community development. Health & Place , 319-327.

Balmer, K. G. (2005). The Diggable City: Making Urban Agriculture a Planning Priority. Portland: Portland State University.

Battersby, J. M. (2013). Growing Communities: Integrating the Social and Economic Benefits of Urban Agriculture in Cape Town. Dordrecht: Springer Science+Business Media.

Beckie, M. &. (2010). Planting Roots: Urban Agriculture for Senior Immigrant. Journal of Agriculture, Food Systems, and Community Development , Vol. 1.

Bently, S. a. (2005). Fighting Global Warming at the Farmer's Market: The Role of Local Food systems in Reducing Greenhouse Gas Emissions. A Food Share Research in Action Report.

Beth Sanders, A. S. (2011). Cutting Through the Red Tape: A Resource Guide for Local Food Policy Practitioners & Organizers. Oakland: Institute for Food and Development Policy.

Bradley, K. &. (2013). Practicing food justice at Dig Deep Farms & Produce, East Bay Area, California: self-determination as a guiding value and intersections with foodie logics. Local Environment , 1-15.

Bregendahl, C. &. (2007). The Role of Collaborative Community Supported Agriculture: Lessons from Iowa. North Central Regional Center orth Central Regional Center for Rural Develo or Rural Development.

Brown, M. a. (Spring 2007). City Hall Steps In. NHI - ShelterForce Online , Issue #149.

Brodt, S. G. (2007). The Low Carbon Diet Initiative: Reducing Energy Use and Greenhouse Gas Emissions in the Food System Using Life Cycle Assessment: Summary on Critical Issues and Research Methods.

Carlsson-Kanyama, A. (1997). Weighted Average Source Point and Distances for Consumption Origin Tools for Environmental Impact Analysis? Ecological Economics 23 , 15-26.

City Growers. (2013, September 20). City Growers - Converting Urban Lots into Sustainable Farms. Retrieved April 20, 2015, from Kickstarter: https://www.kickstarter.com/projects/22144453/city-growers-converting-urban-lots-into-sustainabl

City of Boston. (2013, December 20). Article 89: Urban Agriculture. Retrieved 31 2015, January, from Boston Redevelopment Authority.

City of Boston. (2015, April 15). Office of Food Initiatives: Directives.

Chen, K. (2014, September 19). DC considers bill to encourage urban farming on vacant lots. The Washington Post .

Chin, D. T. (2013, May). Urban Farming in Boston: A Survey of the Opportunities. Boston.

Christensen, R. (2007). SPIN-Farming: advancing urban agriculture from pipe dream to populist movement. Sustainability: Science, Practice, & Policy , 3 (2), 57-60.

Council, M. C. (2011). Urban Agriculture Plan. Chapter 3 Existing conditions. Minneapolis.

Colasanti, K. J. (2013). The city as an “Agricultural Powerhouse”? Perspectives on expanding urban agriculture from Detroit, Michigan. . Urban Geography .

Colasanti, K. L. (2010). Growing Food in the City - The Production Potential of Detroit’s Vacant Land. The C.S. Mott Group at MSU.

Conference, M. U. 3rd annual Massachusetts urban farming conference. Cultivating lands, nourishing communities, building businesses. Worchester, MA: Worchester State University.

Conner, D. S. (2008). The Food System as an Economic Driver: Strategies and Applications for Michigan. Journal of Hunger & Environmental Nutrition , 371-383.

Community Law Center. (2014, October 2). The Urban Agriculture Law Project. Retrieved January 31, 2015

Communities, P. f. (2011, September). Urban farm business plan: handbook. Retrieved April 2015

Corey, R. (2015, February 26). Inquiry into Chateau Hough with the Founder. (M. Frazier, Interviewer) via phone.

Corrigan, M. P. (2011). Growing what you eat: Developing community gardens in Baltimore, Maryland. Applied Geography , 1232-1241.

Crop Circle Kitchen. (2014). Frequently Asked Questions. Retrieved April 14, 2015, from Crop Circle Kitchen: http://www.cropcirclekitchen.org/FAQ.html

Essington, K. (2015, March 20). Urban land and urban agriculture. The Trust for Public Land.

Essington, K. (2015, February 2). Executive Director, The Trust for Public Land. (K. R.-F. Rachel Corey, Interviewer)

Essington, K. (2015, February 17). Executive Director, Trust for Public Land. (M.-F. R. Kelly Riley, Interviewer)

Erickson, L. G. (2015). Urban Agriculture in Seattle: Policy and barriers.

Dudley Street Neighborhood Initiative Inc. (2014). Dudley Neighbors, Inc. Retrieved April 20, 2015, from Dudley Street Neighborhood Initiative: http://www.dsni.org/dudley-neighbors-inc

Dudley Street Neighborhood Initiative Inc. (2014). History. Retrieved April 13, 2015, from Dudley Street Neighborhood Initiative: http://www.dsni.org/history

Dudley Street Neighborhood Initiative. (n.d.). History. Retrieved April 4, 2015, from DSNI: http://www.dsni.org/history

D. Mertens, A. W. (2012). Program Evaluation Theory and Practice. New York: The Guilford Press.

Deike, J. (2014, March 29). Is your City a Food Desert? Retrieved January 31, 2015, from Ecowatch.

Food Law & Policy Clinic of Harvard Law School for Conservation Law Foundation. (2014). Farm & Food Law: A Guide for Lawyers in the Legal Services Food Hub Network. Cambridge: Food Law & Policy Clinic of Harvard Law School for Conservation Law Foundation.

Ford, T. G., Bogash, S. M., Orzolek, M. D., Kime, L. F., & Harper, J. K. (n.d.). Garlic Production. Retrieved April 19, 2015, from Penn State: College of Agricultural Sciences: http://extension.psu.edu/business/ag-alternatives/horticulture/vegetables/garlic-production

Frazier, M. (2014). Urban Agriculture Zone: Winery Expansion. Neighborhood Solutions, Inc., Cleveland.

Frazier, M. (2015). Urban Agriculture Zone: Winery Expansion. Powerpoint, Neighborhood Solutions.

Frazier, M. (2015, February 26). Inquiry into Chateau Hough with the Founder. (R. Corey, Interviewer) via phone.

Freight Farms. (2014). Freight Farms. Retrieved March 27, 2015, from Freight Farms: http://freightfarms.com/

Gunther, M. (2010, September 20). Urban farming: It's a growth business. Retrieved 2015

Ganguly, S. P. (2011). Lively'Hood Farm Financial Analysis: A Feasibility Study of Commercial Urban Agriculture in the City of San Francisco. San Francisco: San Francisco Department of the Environment.

Gateway Greening. (2008, April). Whitmire Study. Retrieved from Gateway Greening Community Garden Areas, Reversing Urban Decline.

Gittleman, M. (2015, April 9). Farm Education Manager, Kingsborough Community College. Barn and Mill Data Tools.

Glover, T. D. (2004). Social Capital in the Lived Experiences of Community Gardeners. Leisure Sciences: An Interdisciplinary Journal , 143-162.

Glover, T. S. (2005). Association, Sociability, and Civic Culture: The Democratic Effect of Community Gardening. Leisure Sciences , 75-92.

Global Green USA. (2012). Urban Agriculture Feasibility Study for Youngstown, OH. Santa Monica: Global Green USA.

Golden, S. (2013). Urban Agriculture Impacts: Social, Health, and Economic: A Literature Review. Davis: University of California Agriculture and Natural Resources.

Green Leigh, N. a. (2013). Planning Local Economic Development: Theory and Practice. Thousand Oaks, CA: Sage Publications.

Growers, C. (2015). Our Vision. Retrieved January 31, 2015

Growing Power. (2014). The Vertical Farm. Retrieved April 4, 2015, from Growing Power Inc.: http://www.growingpower.org/education/vertical-farm/

Institute for a Competitive Inner City. (2012). Designing an Inner City Food Cluster Strategy. Boston: ICIC.

Haberman, D. L. (2014). The Potential of Urban Agriculture in Montréal: A Quantitative Assessment. ISPRS International Journal of Geo-Information , 1101-1117.

Hagey, A., Rice, S., & Flournoy, R. (2012). Growing Urban Agriculture: Equitable Strategies and Policies for Improving Access to Healthy Food and Revitalizing Communities . Policy Link.

Heller, M. C. (2000). Life Cycle-Based Sustainability Indicators for Assessment of the US Food System. Ann Arbor: University of Michigan: Center for Sustainable Systems.

Hendrickson, J. (1996). Energy Use in the US Food System: A Summary of Existing Research and Analysis. Center for Integrated Agricultural Systems, Madison: University of Wisconsin.

Hendrickson, M. K., & Porth, M. (2012). Urban Agriculture - Best Practices and Possibilities. University of Missouri Extension. St. Louis: Urban Sustainability Directors.

Hendrickson, M. P. (2012). Urban Agriculture - Best Practices and Possibilities. St. Louis: Division of Applied Social Sciences.

High Mowing Seeds. (http://www.highmowingseeds.com/organic-garlic-growing-and-seed-saving-info.html)

Higher Ground Farm. (2013, March 3). Let's Raise the Roof (Farm)! Retrieved April 20, 2015, from Kickstarter: https://www.kickstarter.com/projects/highergroundfarm/lets-raise-the-roof-farm/description

Housing and Urban Development. (2014, December). Vacant and Abandoned Properties: Turning Liabilities Into Assets. Retrieved April 13, 2015, from Evidence Matters.

Homestead Community Land Trust. (2014). About Community Land Trusts. Retrieved January 31, 2015

Jennings, A. (2014, October 29). L.A. City Council introduces plan to encourage urban farming. LA Times .

Joanna Hamilton, H. K. (2012). Collaborative Planning for Local Food Systems: Municipal Priorities in Action. Tufts University Department of Urban and Environmental Policy and Planning.

Jones, T. (2006). Using Conte mporary Archaeology and Applied Anthropology to Understand Food Loss in the American Food System. Phoenix: Bureau of Applied Research in Anthropology, University of Arizona.

Katherine Alaimo, E. P. (2008). Fruit and Vegetable Intake among Urban Community Gardeners. Journal of Nutrition Education and Behavior, 94-101.

Keefe, T. (2015, 28-March). 3rd Annual Massachusetts Urban Farming Conference. (R. Goldman, Interviewer)

Keene Organics, (http://store.keeneorganics.com/100polaplsi2.html).

Kerton, S. &. (2009). Buying local organic food: a pathway to transformative learning. Agriculture and Human Values , 401-413.

Knecht, B. (2015, March 20). Land: policy, availability & strategy. (K. Riley, Interviewer)

Kobayashi, M. T.-N. (2010). The Activities and Impacts of Community Food Projects. USDA/NIFA.

Kollin, C. (2010, September 2). Urban farming: It's a growth business. Retrieved April 13, 2015, from Marc Gunther.

Koski, H. (2012). The Guide to Urban Farming in New York State. Ithica: Cornell University Department of Horticulture.

Kotlowitz, A. (2012, July). Plant Tomatoes. Harvest Lower Crime Rates. Retrieved from Mother Jones: http://www.motherjones.com/media/2012/07/chicago-food-desert-urban-farming

Krasny, M. E. (2002). Participatory Approaches to Program Development and Engaging Youth in Research: The Case of an InterGenerational Urban Community Gardening Program. Journal of Extension , 1-16.

Larkin, J. (2015, April 7). Nubia. (M.-F. Rivera, Interviewer)

Levy, K. (2008). Sustainability in Philadelphia: Community Gardens and Their Role in Stormwater Management. Retrieved from Urban Agriculture and Community Food Security Research and Practice: https://sites.google.com/site/urbanagriculturephiladelphia/university-of-pennsylvania-student-work

Levkoe, C. Z. (2006). Learning Democracy through Food Justice Movements. Agriculture and Human Values , 89-98.

Liborio, J. (2015, March 20). Youth and Urban Farming. (K. Riley, Interviewer)

Lloyd, G. (2015, April 7). City Growers. (M-F. Rivera, & R. Corey, Interviewers)

Loh, P. (2015, January). How One Boston Neighborhood Stopped Gentrification In Its tracks. YES! Magazine , pp. 34-39.

Nugent, R. (2001). The Impact of Urban Agriculture on the Household and Local Economies.

NYCCLI, N. Y. (2015). http://nyccli.org/. Retrieved 2015 *йил* 26-January

National Conference of State Legislatures. (2014, April). Urban agriculture state legislation. Retrieved April 2015

Network, M. N. (2015). Top 10 Green US Cities. Retrieved January 31, 2015

MA Department of Revenue. (2014, April 1). Sole Proprietorships. Retrieved April 1, 2015, from MA Department of Revenue: http://www.mass.gov/dor/businesses/current-tax-info/guide-to-employer-tax-obligations/business-income-taxes/sole-proprietorships.html

Madison, U. o. (n.d.). Tiers of the Food System. Retrieved January 31, 2015, from Center for Integrated Agricultural Systems.

Mass. General Laws, C. 1. (n.d.).

Massachusetts Urban Farming Conference. 3rd annual Massachusetts urban farming conference. Cultivating lands, nourishing communities, building businesses. Worcester, MA: Worcester State University.

McCormack, L. A. (2010). Review of the Nutritional Implications of Farmers' Markets and Community Gardens A Call for Evaluation and Research Efforts. Journal of the American Dietetic Association.

Mendes, W. B. (2008). Using land inventories to plan for urban agriculture; experiences from Portland to Vancouver. Journal of the American Planning Association , 435-449.

Metcalf, S. S. (2011). Growing Buffalo's capacity for local food: A systems framework for sustainable agriculture. Applied Geography , 1242-1251.

Mihaly, E. (2015, April 4). Legal Fellow/Attorney at Conservation Law Foundation. (M.-F. Rivera, Interviewer)

Mironova, O. (2014, April 29). The Value of Land: How Community Land Trusts Maintain Housing Affordability. Retrieved January 31, 2015, from The Architectural League's Urban Omnibus.

O'Leary, A. R. (2014). Evaluating the Impact of Community Gardens in Dorchester. Boston: Northeastern University.

Ober Allen, J. A. (2008). Growing Vegetables and Values: Benefits of Neighborhood-Based Community Gardens for Youth Development and Nutrition. Journal of Hunger & Environmental Nutrition , 418-439.

Pezzino, J. (2014). Grow Pittsburg: Urban Agriculture Policy Priorities. Pittsburg.

Pearson, L. P. (2010). Sustainable urban agriculture: stocktake and opportunities. International Journal of Agricultural Sustainability , 7-19.

Pierson, T. (Institute for Agricultural and Trade Policy). Beyond the farm bill. Retrieved April 2015

Pipkin, W. (2014 *йил* 22-July). Meet DC's urban farmers growing food and profits. Elevation DC .

Pirog, R. T. (2001). Food, Fuel and Freeways: An Iowa Perspective on how Far Food Travels, Fuel Usage and Greenhouse Gas Emissions. Leopold Center for Sustainable Agriculture, Des Moines: Iowa State University.

Phillips, A. (2013, March 13). Northeast Organic Farming Association. Retrieved April 19, 2015, from Growing Salad Greens: An Easy and Lucrative Cash Crop: http://www.nofamass.org/articles/2013/03/growing-salad-greens-easy-and-lucrative-cash-crop

Sumner, J. M. (2010). Putting the culture back into agriculture: civic engagement, community and the celebration of local food. International Journal of Agricultural Sustainability , 54-61.

Sustainable Agriculture Research and Education. (2001). Profit by Planning: Helping Fresh Market Vegetable Growers Meet Financial Goals and Improve their Quality of Life. Retrieved January 31, 2015

Sax, D. (2015, February 12). How A Winery is Transforming Cleveland's Most Notorious Neighborhood: The Incredible Story of Chateau Hough. Retrieved February 15, 2015, from Good: http://magazine.good.is/features/chateau-hough-cleveland-winery

Saldivar-Tanaka, L. &. (2004). Culturing community development, neighborhood open space, and civic agriculture: The case of Latino community gardens in New York City. Agriculture and Human Values , 399-412.

Schmelzkpf, K. (1995). Urban Community Gardens as Contested Space. Geographical Review , 364-381.

Sisson, L. (2015 йил 28-March). 3rd Annual Massachusetts Urban Farming Conference. (R. Goldman, Interviewer) Worchester, MA.

Smit, J. N. (2001). Urban Agriculture: Food, Jobs and Sustainable Cities. The Urban Agriculture Network, Inc.

Smith, H. (2015, April 17). A Further Look into DSNI and Urban Farm Land. (R. Corey, Interviewer)

Southside Land Trust. (n.d.). Mission, Vision, Values. Retrieved January 31, 2015

SPUR. (2012). Public Harvest. San Fransicsco: SPUR.

SPIN Farming LLC. (2015). SPIN-A New Way to Learn to Farm. Retrieved April 12, 2015, from SPIN Farming: http://spinfarming.com/whatsSpin/

Stewart, A. (2015, April 4). Inquiry. (R. Corey, Interviewer)

Stewart, A., & Corey, R. (2015, April 4). Inquiry.

Ryan. (2014, December 6). Mayor Walsh dismisses director of food initiatives. The Boston Globe .

Rayburn, E. M. (2013, July 29). Low-Profit Limited Liability Company (L3C). Retrieved April 1, 2015, from The International Association of Commercial Administrators (IACA): http://www.iaca.org/wp-content/uploads/20130826Low-Profit-Limited-Liability-Company-L3C1.pdf

Renooij, S. (2015). Bottling community identity and a sense of place: An investigation of the American craft beer industry and its potential role for neighborhood revitalization. Northeastern University, School of Public Policy and Urban Affairs, Boston.

Twiss, J. D. (2003). Community Gardens: Lessons Learned From California Healthy Cities and Communities. American Journal of Public Health , 1435–1439.

Teig, E. A. (2009). Collective efficacy in Denver, Colorado Strengthening neighborhoods and health through community. Health & Place , 1115-1122.

Tettlebaum, B. C.-V. (2014). How to Choose a Business Structure. Wholesome Wave, CLF Ventures, Conservation Law Foundation. -: Wholesome Wave .

Tichenor, N. (2012). Access to Community Gardens in Boston. Boston: Tufts University Friedman of Nutrition Science and Policy.

Tichenor, N. (2012). Case Study: Urban Agriculture in Kansas City. Boston: Tufts University Friedman School of Nutrition Science & Policy .

Thaden, E. R. (2010). Outperforming the Market: Delinquency and Foreclosure Rates in Community Land Trusts. Madison: Lincoln Institute of Land Policy.

The Conservation Law Foundation, C. V. (2012). Growing Green: Measuring Benefit, Overcoming Barriers, and Nurturing Opportunities for Urban Agriculture in Boston. Boston.

The Trust for Public Land. (2015). About Us: Our Mission. Retrieved January 31, 2015

The Trust for Public Land. (2014). Garrison-Trotter Farm. Retrieved January 31, 2015, from Trust for Public Land.

The Trust for Public Land. (2015). ParkScore Index. Retrieved January 31, 2015

Travaline, K. &. (2010). Urban agriculture and ecological citizenship in Philadelphia. Local Environment , 581-590