Durham County Food System:
A Qualitative Analysis of Actors, Missions, and Challenges

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Abstract

In the context of a national movement around local food, our clients, the Duke Campus Farm and World Food Policy Center want to know what they can do to best engage with and support the local food system (LFS) in their community of Durham County, North Carolina. We conducted an exploratory case study to characterize the current network of actors within the Durham LFS and the challenges they face, in order to provide recommendations to our two Duke clients. Qualitative analysis of interview data resulted in a network sociogram showing two main clusters of actors, generally separated by sector and mission. The primary challenges facing these actors include financial barriers, lack of communication, and social environment barricades. We recommend that our clients 1) facilitate communication between network actors 2) assist with collecting baseline data for evaluation, and 3) provide relevant policy analysis.
Acknowledgements

We would like to thank our clients, Sarah Zoubek and Dr. Saskia Cornes, for being the impetus behind this important work. We would also like to thank the many members of the Durham community who contributed their time and honest reflections, without which our project would not have been possible.

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And last, but certainly not least, we are extremely grateful to our amazing advisor, Dr. Pamela George, whose constant support, guidance, and encouragement not only got us through this endeavor but made it a fantastic experience.

Thank you!
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Acronyms and Key Terms

Actor - any organization determined to be a part of the Durham County local food system
BCBSNC - Blue Cross Blue Shield North Carolina Foundation
CEFS - Center for Environmental Farming Systems
CFAH - Center for Advanced Hindsight
CFSA - Carolina Farm Stewardship Association
DCADFPP - Durham County Agricultural Development and Farmland Preservation Plan
DCSWCD - the Durham County Soil & Water Conservation District
DCF - Duke Campus Farm
DPS - Durham Public Schools
DFFN - Durham Farm and Food Network
ECO - Eastern Carolina Organics LLC
Farm Board - (see FPAB)
FPAB - the Durham County Farmland Preservation Advisory Board
IFFS - Interfaith Food Shuttle
LFS - Local food system
NC State - North Carolina State University
SNA - Social Network Analysis
Soil & Water - (see DCSWCD)
UNC - University of North Carolina
WFPC - World Food Policy Center
Executive Summary

In the context of the growing local food movement, the clients of this project, the Duke Campus Farm (DCF) and World Food Policy Center (WFPC), are interested in learning how they can best engage with the local food system in their community of Durham County, North Carolina. Toward the central question of How can the DCF and WFPC best engage with the Durham County food system? our research asked four sub-questions:

1. Who are the actors within the Durham County food system?
2. What are the relationships between these actors? Who is seen as a key player?
3. What are the needs and challenges that these actors face? Where are there gaps in action, and why?
4. What can Duke entities do or provide to fill these needs and gaps?

Our project is an exploratory case study with influences from social network analysis methodology. We conducted 22 interviews, transcribed audio recordings of each, and imported the data into an NVivo 11 Pro project for qualitative analysis. Our interviewees comprised representatives of twenty-three food and agriculture organizations that act within the Durham County LFS, and an additional twenty-five actors were identified but not interviewed.

A network sociogram depicts collaboration among identified actors, and shows two main clusters of actors, separated by sector and missions: one cluster is primarily for-profit actors focused on agricultural production, and the other is mostly nonprofit and government entities whose activities encompass more diverse missions including education, health, and food access. The most prominent challenges identified by interviewees are 1) Financial barriers; 2) Lack of communication; 3) Social environment and policy issues; 4) Lack of information; and 5) Short of staff. But these challenges are interconnected such that addressing one may in turn alleviate another.

The key recommendations to our Duke clients are threefold:

1) Focus on facilitating communication between actors: This may include simply compiling existing educational resources, or offering workshops related to specific communications topics.
2) Support evaluation efforts: This could also include compiling educational resources, or the WFPC and DCF could facilitate projects that partner students with local organizations to provide baseline data or project assessments.

3) Policy Analysis: As the WFPC is housed within the Sanford School of Public Policy, we recommend that they initiate projects that will provide accessible explanations of local policies related to food and agriculture.

Introduction

Clients and Research Question

As Lamie et al. described in their "Call for a Collaborative Approach to Assessment" of LFS in the South (2013), universities have the potential, in conjunction with government, nonprofit, and extension efforts, to act as a catalyst for research and information-sharing, and to help coordinate piecemeal LFS development.

At Duke University, both the Duke Campus Farm (DCF) and the World Food Policy Center (WFPC) have an expressed interest in supporting local food systems in the Durham community. The Duke Campus Farm was founded in 2010 with a mission to inspire and empower the Duke community to catalyze food system change (Duke Campus Farm, 2014). World Food Policy Center is a grant funded research center in Duke University Sanford School of Public Policy, with research focus on food policy.

The primary research question that our project addresses is: How can the DCF and WFPC best engage with the Durham County food system? Four sub-questions help us answer the overarching research question:

1. Who are the actors within the Durham County food system?
2. What are the relationships between these actors? Who is seen as a key player?
3. What are the needs and challenges that these actors face?
4. What can Duke entities do or provide to fill these needs and address challenges?
Local Food Systems and their Assessment

There is no one universally-adopted definition of a “local food system” (Martinez, S, 2010). While food system is defined as an aggregation of food production, processing, distribution, consumption, and disposal within a geographical scope (Allen & Prosperi, 2016) “local food systems” (LFS) are seen as an alternative to the conventional food system, and can be characterized by “short supply chains, collaborative relationships between buyers and sellers, support services provided by local businesses, and an intentional focus on the social, economic, and environmental impacts of the production, distribution, consumption, and disposal of food in the community” (Lamie et al., 2013).

A regional food system is expected to build up community based approach to food production as well as relieve social, economic and environmental problems associated with food and agriculture practices. The capacity of a food system would satisfy the need of various stakeholders, including food consumers, food system practitioners (business and organizations), and echo with the need for social development, as shown in Figure 1, the pyramid for need hierarchy.

![Figure 1. Demand Pyramid and Capacity Goal of Food System](image-url)
To this end, developing the local food system echoes with the need of the consumers, food organizations and ultimately fits in the strategic plan for regional development in local community. Over the last two decades, the United States has seen the rise and evolution of a movement around local food (Pirog et al. 2014). Endeavors to develop local food system have been seen with various approaches, from government and policy making, civil societies and business.

In North Carolina, research has been done to study the local food system both on a state level and in few counties of the state. The Center for Environmental Farming Systems (CEFS) is a partnership of state institutions in North Carolina that provides research, outreach, and education for sustainable agriculture and community-based food systems. Their 2010 report “From Farm to Fork: A Guide to Building North Carolina’s Sustainable Local Food Economy” focuses on recommendations for specific actions that can be taken to support LFS statewide, which encompasses both the food system at the state level as well as nested LFS on the scale of county-wide areas or regions (Curtis et al.). This guide repeatedly acknowledges the need to coordinate existing programs and initiatives around local food, and recommends that local food policy councils can be a mechanism for actively coordinating the coinciding efforts of multiple groups. The concluding recommendations include a focus on providing economic support and training for farmers to assist with land access and diverse market opportunities. Other recommendations are to support the development of community gardens; provide education and outreach around local food and food systems; coordinate existing programs related to health and food access; and for local governments to engage in planning for farmland protection and policies to promote “farm, garden, market, and infrastructure development” (Curtis et al., 2010).

After the release of the From Farm to Fork Guide for North Carolina, the Cabarrus County Board of Commissioners hired CEFS to conduct an assessment of the Cabarrus County food system (Cruze & Curtis, 2010). The Cabarrus County Food System Assessment was based on data gathered from secondary sources, as well as a combination of qualitative data from stakeholder interviews and focus groups. The assessment was based on an economic perspective of the food system, and thus recommendations are based on characterization of the available resources and challenges for actors involved in different components of the food supply chain
(i.e. production, processing, distribution, etc.). Cruze and Curtis concluded with recommendations that echo those of the *From Farm to Fork Guide*: coordinated strategic planning, along with education or training on food systems for decision-makers; provide economic incentives and support for farmers in accessing land and more diverse market opportunities; offer consumer education programs; and engage in regional-scale marketing efforts for local food (Cruze & Curtis, 2010).

In 2012, two Master of Environmental Management students at Duke University’s Nicholas School of the Environment produced “A Network Analysis and Knowledge Map of the Agricultural Sector in Alamance County, NC” (Hansen & Overton). This case study focused specifically on the agricultural aspects of the Alamance County LFS, with qualitative data collected primarily via semi-structured interviews. The purpose of the project was to provide recommendations to a new nonprofit organization with a focus on agricultural production. Hansen and Overton chose to perform a social network analysis to identify the most-connected actors in the LFS, to provide prioritized recommendations for outreach for the newly-founded organizations. Their results show cohesive subgroups among actors and “three persistent and interrelated challenges within the agricultural community in Alamance County: marketing, communication, and leveraging local knowledge” (Hansen & Overton, 2014).

Evaluation of LFS is particularly challenging due to their interdisciplinary nature. In 2013, Lamie et al. explained why evaluation is a common challenge in LFS development in their article titled “Local Food Systems in the South: A Call for a Collaborative Approach to Assessment.” Lamie et al. argued that the challenge of LFS assessment stems from the difficulty of coordinating the planning and implementation of various aspects of a system; LFS growth is often piecemeal, resulting in piecemeal evaluation, and data being scattered across different sources (Lamie et al., 2013). They proposed that regional-scale organizations and institutions should be a hub for collecting and sharing information. Whether this would coincide or conflict with the efforts of community food councils as proposed by CEFS (Curtis et al. 2010) is unclear. Lamie et al. also recommended that since effective evaluation depends on the comparison to a reliable baseline, early data collection is crucial.

In 2015, researchers from the University of California, Davis and the University of North
Carolina, Chapel Hill published a methodological framework for using social network analysis (SNA) as an approach to visualizing and analyzing food system collaboration (Christensen & O’Sullivan). They demonstrated the process of collecting qualitative data for a set of organizations, including attributes such as organization type, and calculating centrality measures to describe the connectedness of the organizations within a network. Results also included the identification of five subgroups identified by clique analysis. Their conclusion is that SNA is most useful for describing changes in the network over time, such as a shifting balance of groups with different missions.

The Durham County Local Food System

Durham County is North Carolina’s 6th most populous county, with a total population of 295,373 in 2016 and a growth rate of 10.3% from 2010. The race structure is shown in Figure 2, with minority groups including black or African American, Asian, Pacific Islander and other race group making up 48% of the total population. The Durham City-County government predicts a robust population growth rate of 47% over the next 30 years (City of Durham, 2016). Durham enjoys a growing economic base. The median household income in 2015 is 11.8% higher than that of North Carolina and 12.85% higher than that of Durham County in 2010 (Census Block Group, 2016).

In 2009, the Durham Board of County Commissioners adopted the *Durham County Agricultural Development and Farmland Preservation Plan* (DCADFPP), a report commissioned by the the Durham County Farmland Preservation Advisory Board (FPAB) (Cohn, 2009). It provides the most comprehensive overview to date of the state of food production and marketing in Durham County. The results are primarily based on qualitative data from interviews.
and public outreach meetings, as well as reviews of land use plans, ordinances, regulations, and maps. The DCADFPP includes suggestions for county-level food policies, and identifies over a dozen government, private, and nonprofit organizations engaged in farmland conservation partnerships with the County. The report also identifies two coinciding trends in Durham farmland over the past century: while the number farmed acres has decreased, the relative number of acres in vegetable production has increased, illustrating the shift from traditional cash crops to small-scale alternative agriculture (Cohn, 2009). Recommendations in the DCADFPP are focused on providing support for local farmers and incentives for attracting new farmers to the area. Nevertheless, this document focuses on specifically agriculture production in Durham, instead of the entire local food system, which involves other industry and stakeholders along the food supply chain.
Methods

Tradition of Inquiry

Our project is an exploratory case study of the local food system in Durham County, NC, with a more in-depth analysis of multiple cases of local food organizations. A case study is an inquiry into a specific system, typically bounded in space and time (Stake, 2003). It gathers data from multiple sources, creates detailed description of the case, and make assertions about the case (Creswell, 1998).

This is an exploratory case study, because the particular case of the Durham LFS lacks detailed preliminary research (Mills et al., n.d.). No baseline data is available for tracking the actors in Durham LFS and the relationships between them, nor is there analysis about how college entities/research institute like Duke University could serve their needs and support them tackle challenges. Our project gathers and analyzes data about a group of organizations and aims to apply the general trend of the case (sampled organizations) to a broader class (food system within the political boundaries of Durham County).

This study focuses on a contemporary (2016) phenomenon in a real-life context.

Data Collection

We draw our data collection methods from previous assessments of LFS in North Carolina that are based on qualitative data collected via interviews with food and agriculture-related organizations within a county-wide area (Cruze & Curtis, 2010; Hansen & Overton, 2014). We conducted interviews with organizations in Durham County selected using a “snowball” sampling method (or “chain referral sampling”). Snowball sampling is defined as "a technique for finding research subjects where one subject gives the researcher the name of another subject, who in turn provides the name of a third, and so on” (Vogt, 1999). The sampling process is based on the assumption that there are links between the initial sample and others in the same target population (Berg, 1988).

At our client’s suggestion, we met with the Coordinating Council of the Durham Farm and Food Network (DFFN), Durham’s local food policy council to begin compiling a list of actors within the local food system. We assumed investigating with local food council would be
an appropriate start of “snowball” sampling as a local food policy council is typically comprised of representatives of community residents, local organizations, business and government departments from various sectors of food system. (Hodgson, 2011). Local food council serves to promote communication and mutual beneficial solutions to food system problems. At one DFFN meeting, we collected from representatives anonymous feedbacks about “Who/What organizations in local food network do you think is making impact in Durham?” A list was created based on the feedbacks. Additionally, we complemented the list we received from DFFN based on results of internet searches for small farms and local-sourcing restaurants in Durham.

All interviews were conducted from September-December 2016. To establish consistency in our interview process, we conducted the first three interviews as a team. After the initial interviews, each of us independently scheduled and conducted interviews. We collected audio recordings of each interview and transcribed every recording verbatim. In total we conducted 22 interviews, with individuals representing twenty-three distinct food-related organizations that act within Durham County (Table 1). An additional 26 actors were identified -- meaning they were either directly named by interviews or were identified by the researchers in preliminary internet searches. The majority of identified Durham LFS actors fall within the for-profit sector (Table 1). This may be accounted for by the fact that most production-based farms are for-profit entities.
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<th>Sector</th>
<th>Organizations Interviewed</th>
<th>Additional Organizations Identified</th>
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<tr>
<td>Non-profit</td>
<td>● Blue Cross Blue Shield North Carolina Foundation</td>
<td>● Carolina Farm Stewardship Association</td>
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<td></td>
<td>● Durham Roots Farmers’ Market</td>
<td>● Center for Environmental Farming Systems</td>
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<td>● Farmer Foodshare</td>
<td>● Durham Congregations in Action</td>
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<td>● Interfaith Food Shuttle</td>
<td>● Society of St. Andrew</td>
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<td>● Piedmont Environmental Council</td>
<td>● South Durham Farmers Market</td>
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<td>● Reinvestment Partners</td>
<td>● The Durham Farmers Market</td>
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<td></td>
<td>● SEEDS</td>
<td>● UDI Urban Farm</td>
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<td>● West End Community Foundation</td>
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<tr>
<td>For-profit</td>
<td>● Bull City Farm</td>
<td>● Abanitu Organics</td>
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<td></td>
<td>● Community Food Lab</td>
<td>● Blue Whistler Farm</td>
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<td></td>
<td>● Down2Earth Farms, LLC</td>
<td>● Bull City Burger and Brewery</td>
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<td></td>
<td>● Earthseed Land Cooperative</td>
<td>● Buldega Urban Market</td>
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<td></td>
<td>● Eastern Carolina Organics</td>
<td>● Burt’s Bees Inc.</td>
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<td>● Firsthand Foods</td>
<td>● Carolina Farmhouse Dairy</td>
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<td>● Funny Girl Farm</td>
<td>● The Cookery</td>
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<td>● Local 22</td>
<td>● Dig It Farm</td>
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<td>● Pura Vida Farm, LLC</td>
<td>● Durham Co-op Market</td>
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<td>● Four Leaf Farm, LLC</td>
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<td>● Green Button Farm</td>
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<td>● Old Havana Sandwich Shop</td>
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<td>● Piedmont Restaurant</td>
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<td></td>
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<td>● Prodigal Farm</td>
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<td>● Saltbox Seafood Joint</td>
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<td>● Self-Help Credit Union</td>
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<td>Government</td>
<td>● Durham County Board of Commissioners</td>
<td>● Durham Public Schools</td>
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<td>● Durham County Department of Public Health</td>
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<td>● Durham County Farmland Preservation Advisory Board</td>
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<td>● Durham County Soil &amp; Water Conservation District</td>
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<td></td>
<td>● Durham Public Schools Hub Farm</td>
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<tr>
<td>Community (voluntary)</td>
<td>● End Hunger Durham</td>
<td>● Durham Farm and Food Network</td>
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<tr>
<td>Institution</td>
<td>● Center for Advanced Hindsight</td>
<td>● Duke (Duke Hospital and Duke University)</td>
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<td>● North Carolina State University</td>
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<td>● University of North Carolina</td>
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Table 1 Identified actors within the Durham County local food system.
Data Analysis

NVivo 11 Pro is used for data analysis in this project. NVivo is a software that supports qualitative method research and helps organize, analyze unstructured or qualitative data like interviews, open-ended survey, web content, etc (QSL International, 2017). In NVivo, a collection of references about a specific theme, object or area of interest is called a “node”, while the process of putting references into a “node” is known as “code”.

In this research, we used “nodes” to represent the sub questions we would like to investigate. During the period when we were conducting interviews, we created an outline of the “code book” with each “node” defining one aspect of our research question, which would be used to analyze the transcribed data. We defined theme nodes and subnodes based on the information that would be needed to answer our research subquestions, thus our node structure is closely aligned with our interview protocol. These nodes and their definitions were refined throughout the coding process. (See Appendix II for the complete code book).

After one interview was conducted and recorded, we transcribed the record and imported the transcription into NVivo, “coded” the references to corresponding “nodes”. Each team member created a project file in NVivo 11 Pro and uploaded the transcripts for two randomly chosen interviews, and also created memo to record individual notes throughout the coding process. We collectively decided to code by the unit of whole sentences, and also included a theme node for content that did not fit within one of the already-established nodes.

To ensure both research code the transcriptions following the “code book” protocol, after each team member independently coded the two randomly chosen interviews, we ran an intercoder reliability query which showed coding agreement percentages in the range of 90-100% for the majority of nodes with an average kappa value nearly equivalent to 1. We then split up the remainder of the coding by randomly dividing the remaining interview transcripts between us.

Social Network Analysis in NVivo

We created a network sociogram based on relationship nodes using NVivo 11 Plus. We created case nodes for each of the organizations interviewed as well as organizations that were
identified as collaborators with those that we interviewed. Cases were classified by the name of the organization represented, whether or not a representative of the organization was interviewed, and the sector it belongs to (i.e. for-profit, government, etc). Food system assessments would generally focus on the different components of the food system (i.e. production, distribution, etc.), but because our project is framed primarily as a social network analysis and not a food system assessment, we chose to delineate actors based on the sector of their organization. The full text of each interview was coded to the case node of the organization that it represents. We then created relationship nodes to establish connections between cases. The relationship nodes were created based on interview data that had already been coded to the theme sub-node “Collaboration” under “Relationship.” Therefore, causal relationships or mentions of competition were not included in relationship nodes.

The resulting diagram was then recreated in LucidChart and modified to improve visual appeal and ease of reading. SNA is an established method for describing collaboration among actors within a food system. According to Christensen and O’Sullivan, the process “...entails gathering data about the interactions of individuals, groups, and/or organizations and then using this information to describe various aspects of collaboration” (2015).

**Positionality**

Our positionality during the research is as graduate students of Duke University’s Nicholas School of the Environment, as student consultants for two Duke organizations and as observers of the local food system. Both of the researchers, who moved to Durham County 18 months ago, were not familiar with the local cultural and social context. One of the researchers comes from China, with English as the second language. These positionalities further emphasized our role as observers. However, it is not observed that different cultural or language background hinders the communication with the interviewees or interpretation of the observations.

Theoretically, as external consultants, we would not have interest with the interviewees. However, we’re inevitably insiders of the local food system, as we share similar language and values with the interviewees and make appearance at local food policy council gatherings. This
positionality has allowed us to stay neutral during observations and take a closer look into the structure, process and attitude of the interviewee, many of which were not revealed by the interviews. Nevertheless, this positionality could also blur the border between an objective observer and an intervener, as in some cases during the research some organizations misread our role as voluntary consultant to their organizations.
Results

Actors, Missions, and Relationships

When studying a "local" or "regional" food system, (developing) relationships among all components and creating tighter linkage between the service/product producers and consumers is emphasized (Feagan, 2007). Our classification of organizations by their sector reveals that nearly half of identified actors within the Durham LFS are for-profit entities, which includes restaurants and small farms, while a third of the actors are nonprofits (Figure 3).

![Figure 3 Breakdown of 49 Identified Actors Within the Durham County LFS, by sector](image)

No single actor was identified as a key player by more than five interviewees. But six interviewees referred generally to local restaurants as being key or influential actors in the Durham LFS:

"The chefs and the food trucks that really promote where they're getting their food from. You know those are the folks that have a great deal of influence..." (SEEDS)

"Durham restaurants and chefs are amazing. We have so many neat restaurants. I mean most of our customers are in Durham- Imagine that! Two million in sales and we haven't even- we have very little presence in Raleigh, Chapel Hill...so Durham is full of chefs who care. So that's great." (Firsthand Foods)
Both Eastern Carolina Organics and SEEDS were identified as key players by five interviewees. The Center for Environmental Farming Systems (CEFS), Carolina Farm Stewardship Association (CFSA), Durham Public Schools (DPS), and Interfaith Food Shuttle (IFFS) were referred to as influential actors by four interviewees. Interestingly, the key players identified by interviewees do not particularly stand out in terms of their degree of connection within the sociogram (Figure 5). Farmer Foodshare is the actor with the highest degree of connection, meaning the most collaborative relationships with other actors. The next most-connected actors are two more non-profit organizations, the Interfaith Food Shuttle and Reinvestment Partners.

The sociogram depicts two general clusters of actors, one being primarily government and nonprofit organizations, and the other being mostly for-profit entities and institutions (Figure 4). The most-connected organizations are mostly nonprofits, in the first cluster. Among nonprofit actors, the Bull City Cool Food Hub connects many organizations: Bull City Cool is owned by Reinvestment Partners, houses operations for both IFFS and Farmer Foodshare, and also accounts for collaboration among Soil & Water, the FPAB, and Community Food Lab, who were all involved in the development of the food hub. Educational programs for elementary school students account for some collaborations between nonprofit and government actors. The DPS Hub Farm has a particularly strong relationship with the Health Department, and also collaborates with IFFS and Soil & Water on educational programs. IFFS and Soil & Water also collaborate often with one another on other projects. The Geer Street Learning Garden, which is adjacent to the offices of Reinvestment Partners and across the street from Bull City Cool, brings IFFS together with Soil & Water, Burt’s Bees and the BCBSNC Foundation.

When it comes to the for-profit and institution cluster, the collaborations can mostly be characterized as either business partnerships (e.g. buyer-seller relationships) or educational collaborations. Two restaurants are featured in the network for their business relationships with local farms: Bull City Farm sells meat to Old Havana Sandwich Shop, and Pura Vida Farm sells to Local 22. Both of these relationships were described by interviewees as being on the level of friendship, after having developed trust over time. ECO, an aggregator of organic produce, also described significant involvement in supporting the farmers from which they buy. ECO clearly
stated that, as a for-profit entity, the primary focus of their operations is to provide direct support to other businesses, without the involvement of nonprofit actors:

"But a very positive pressure point for us was we never wanted to not be there for farmers. We didn't want to be distracted by the nonprofit networking." (Eastern Carolina Organic)
Figure 4 Sociogram built from collaborative relationships identified between actors within the Durham LFS, with actors colored by sector.
Figure 5 Sociogram built from collaborative relationships identified between actors within the Durham LFS, with actors colored by degree of collaboration.
However, two nonprofit organizations also feature within the for-profit and institution cluster: CFSA and CEFS were both identified by multiple for-profit actors as being strong hubs for information and support for developing food and farming business, through workshops and other resources. These activities account for many the educational collaborations within this cluster. Institutions (Duke, UNC, and NC State) are also identified as playing an educational role, through research activities, as well as providing support and resources for other collaborations. A few farmers also referenced having student volunteers from local institutions. Educational collaborations also include those that farmers have with one-another, such as the mentorship and informal knowledge-sharing that Bull City Farm described as having with other small and beginning farmers.

The one interviewed actor that did not express having any positive or ongoing collaborations with any other actor is the Earthseed Land Cooperative. The isolation of this organization may be explained by their unique perspective on the food system. While Earthseed is a for-profit entity with a mission aligned with agricultural production, it is also the only actor interviewed whose mission includes a strong focus on social justice. Their isolation from the network is understandable in light of their belief that the current LFS is not capable of serving the needs of marginalized populations:

"A lot of folks talk about the food system being broken, but it's not broken- this is the way it's supposed to work. There are plenty of people it's not supposed to serve and plenty of people it's supposed to exploit, and only very few people benefit."

(Earthseed Land Cooperative)

There was also one nonprofit actor who spoke on the topic of equity, and pointed out the general lack of a social justice perspective among LFS actors:

"I think the other piece of this that...is simmering throughout Durham, throughout many of these organizations, is probably more overt in some organizations than others, is this question of equity and what it means to have an equitable food system that is available to all. And looking at how we do things through that lens, that is a capacity that...most organizations still need."(SEEDS)
But SEEDS acknowledged that their own efforts towards understanding the role of social justice in the food system is a new endeavor, saying, “...we are just starting to figure this stuff out.”

Figure 6 Mission spread among selected actors within the Durham LFS, colored by sector.
Figure 7 Mission spread among selected actors within the Durham LFS, colored by sector.

Visualizing a selection of the LFS network from the perspective of shared missions among actors shows further clustering of organizations. Though there is a spread of different missions across the network, some missions are more represented than others (Figure 7). Of the twenty-three organizations interviewed, 17 engage in activities related to the missions of agricultural production, or education, or both. Of the twenty-three organizations interviewed ten
engage in activities related to food access or hunger relief, or health or nutrition. SEEDS and Farmer Foodshare are the two organizations whose activities are coded to the most missions.

As in the sociogram, the majority of for-profit actors are clustered in Figure 6 & 7, this time by the nature of their missions. Most for-profit actors interviewed focus primarily on agricultural production. While there are also nonprofits whose mission relates to growing food, there is likely a difference in the way this mission is approached by organizations across different sectors. Most nonprofit actors that have an agricultural production component to their mission are also heavily involved in education. The scope and nature of an organization’s activities is likely correlated with the extent of their missions. SEEDS and IFFS, two nonprofits with multi-faceted missions, both expressed the sentiment that they have been involved in a variety of different programs and projects, whereas Firsthand Foods (a for-profit actor) has a narrower focus, surmised by the statement that, “…the best thing we can do for Durham is just grow a really good business.” (Firsthand Foods)

Although agricultural production is the most common mission among the identified LFS actors, there was a general sense among most interviewees that the need for more local food production is a vital and urgent issue. DCSWCD quantified the situation: “...there's only about 7,000 acres in production in Durham, but in the present-use taxation there's over 27,000 acres. So about 20,000 acres are fallow, not being farmed.” Another interviewee representing the Farmland Preservation Advisory Board expressed frustration that community members in Durham appear to be more interested in engaging in food & agriculture policy than food production:

“...I was at one of these farm food network meetings, and I asked, you know who wants to farm? Nobody wanted to farm, everybody wanted to do policy, right?” (FPAB)

However, none of the organizations we interviewed had missions related to policy or advocacy. Certain local policy issues, particularly around land taxation, came up in interviews with more than one farmer (see page 33 for more discussion on the policy barriers to local farmers). However, it is likely that legal restrictions on nonprofit and government organizations contribute to the lack of policy focus among identified actors, as described by IFFS who said, “...unfortunately we're not able to speak up on a lot of policy things because we're a nonprofit.”
Challenges

Challenges, including the absence of needed resources, were identified primarily by asking interviewees “What challenges have you faced?” Our exploratory study shows that actors within the Durham LFS face multifold problems constraining their capacity to provide services for their target audiences. In our analysis we identified ten general categories of challenges, the definitions of which can be found in Appendix II. However, it should be noted that these challenges (and their origins) are interrelated, such that the barriers facing the Durham LFS are more of a network, rather than stand-alone issues. For instance, the cause reported of “short of staff” may trace back to “financial barriers” as lack of funding constraints the organization’s ability to recruit more staff. The prevalence of each challenge (Figure 8) is measured using the following criteria:

\[
\text{Percentage of Interviewed Organizations} = \frac{\text{Number of organizations that mentioned this challenge}}{\text{Total number of organizations interviewed}}
\]

![Figure 8 Calculated prevalence of identified challenges](image)
To create the most clear and concise summary of the identified challenges, we outlined this section as follows: 1) Financial Barriers 2) Lack of Communication 3) Social Context and Policy 4) Lack of Information 5) Short of Staff 6) Other challenges.

1) **Financial Barriers**

“Funding...is a constant struggle, because we have a lot of passionate people in this field, but without money it’s hard to do anything." (DPS Hub Farm)

Financial barriers, or the lack of financial resources, is the most well recognized challenge. Twenty-two out of twenty-three (95%) interviewees claimed they have encountered financial barriers of different levels and forms.

It is perceived that, in general, nonprofit and government organizations face different type of financial barriers than for-profit organizations such as farms and food business. While the primary financial challenge for the former is the shrinking amount of available funding coming in, the latter suffers more from growing cost of operation. However, both expressed that financial barriers constrain their organization's' capacity to implement their strategic plans and to expand their operations. Organizations from both sectors expressed concern about not being able to make a strategic plan ahead of time as the funding or financial situation is unpredictable. Illustrating this frustration, IFFS reports, “The hardest part is to find ongoing, sustainable money.” To tackle this obstacle, IFFS expressed the desire to shift from grant-dependence to support from ongoing sponsorship(IFFS).

**Nonprofit and Government Organizations: Decreasing Funding**

When it comes to nonprofit and government organizations, twelve of the fourteen (86%) nonprofit and government interviewees reported financial barriers. The financial challenges facing these organizations is primarily due to decreases in funding. One organization specifically identified the “Cleanwater Management Trust Fund, which has shrunk from a hundred million dollars to ten million,” as an example of government funding at the federal and state level decreasing significantly (DCSWCD). A nonprofit actor worried that “a lot of funders are going to start aging out.” (SEEDS). Two interviewees expressed the concern that the focus of funders has been switching from supporting food systems to other areas. One actor perceived the focus of
the corporate donors changing to health care while another expressed concern that, while land preservation is part of the organization’s focus, they were not certain about if City of Durham wanted to continue paying for the conservation of the land.” (FPB). Decrease in funding is also mentioned by four interviewees from for-profit sector, mainly talking about lack of funding to support farm’s participant of Good Agriculture Practice (GAP) program or difficulty in applying for grant funding for the farm, which will be explained in details in “Growing Operational Cost” and “Lack of Information” section (See page 36).

Interviewees from the public schools and nonprofit organizations expressed that one reason that makes it challenging for organizations to attract funding is that organizations lack the capacity to measure their impacts. For schools, endeavors supporting healthy food procurement or sustainable food related activities (e.g. agriculture workshops or classes) are rarely reflected on test scores. There is not enough measurement on the consequences of investment, so therefore, there is little appealing evidence to convince funders to support sustainable food initiatives. Nonprofits are also confronted with challenges to measure impacts of their investments. Moreover, two nonprofit/government actors mentioned increasing competition over limited funding opportunities, making fundraising efforts “a little bit more stressful.” (Durham County Health Department)

For-profit Organizations: Increasing Cost in Operations and Unpredictable Market

Nine of the twenty-three interviewees represented for-profit organizations, including corporate, farms and restaurants. All of these actors talked about financial barriers. The increasing costs of operations and fluctuating revenues are the primary reasons of financial instability for for-profit entities, particularly small farms. One farmer remarked: “You don’t earn a lot of money doing this...you’re never going to get rich...half the time, you can barely pay your bills.”(Bull City Farm)

All nine of the for-profit actors interviewed acknowledged the challenge of an unpredictable market. While the market for food is described as “very supply and demand driven” (East Carolina Organics), it is hard to accurately predict the number of clients and the demand in the future. As described by one interviewee who represented a local farmer’s market, “[It’s]...very hard to say ‘Come on board, be a customer!’ and then not have enough product to
sell people” (Firsthand Food). Four interviewees identified Good Agricultural Practice (GAP) certification as a financial burden. The GAP certification program is a voluntary audit that verifies that fruits and vegetables are produced, packed and processed as safely as possible to minimize risk of microbial food safety hazards (USDA, 2017). According to interviewees, the cost of GAP certification is a significant burden, as farmers have to pay the travel cost for the federal and state inspectors who come to audit them. The Carolina Farm Stewardship Association (CFSA) reports that the average cost of the audit for farms participating in the project was $925. The charges include an administrative fee of $50, and the auditor’s time, charged at $92/hour (2017). One interviewee noted that there was not a lot of federal or state level funding supporting the acquisition of GAP certification (County Commissioner). Another interviewee claimed that the “external grant, especially for food safety programs” is “not enough.” (Reinvestment Partner)

Four actors mentioned the increasing cost of land acquisition and maintenance. One said that the price of land around the city is less affordable than that away from the city, yet, since the consumers are in the city, farmers have to pay the higher land prices (Funny Girl Farm). Additionally, multiple interviewees reported discrepancies in the property taxes that farmers pay:

"Farmers pay property taxes for supposedly city services from the county or the city government. It turns out that the cost of service, for every dollar in property taxes that an agricultural land pays, [farmers] get 70% in services. Farmers are overpaying for the service they get.” (FPAB)

There were also other types of financial barriers discussed by interviewees. Multiple interviewees also expressed that there is a dilemma between keeping food prices affordable and attractive to consumers and keeping agriculture profitable for local and smallholding farmers. While a substantial proportion of the population in Durham has limited resources to afford food (End Hunger Durham: “around 65% of people have to choose between food and paying their rent,”) food producers face the challenge of setting a price level that would both guarantee a market and reach a break-even point. When local farmers sell their product to retailers, they have to charge retailers a premium which will eventually be folded into the price to consumers. The premium “could make the price of the foods twice as expensive as what they were initially sold
for” (FPAB). Moreover, it was reported that it is also challenging to compete with low-price imported agricultural products:

"It's really tough competing against some of the New Zealand Lamb that's being brought in at a very inexpensive price...the restaurants will say ‘I can get it for $6/pound, so I want you to supply it $6/pound.’ And I went through the charges for processing which are really quite high and add that up what I get for the lamb...and the best I can do is $8/pound to break even. And [the restaurants] don't wanna pay that." (Bull City Farm)

While the factors mentioned above are more likely to be affected by the current social and policy context, interviewees also frequently mentioned endogenous factors of agricultural production that lead to financial challenges within the industry. These include: market challenges for particular products, (e.g. lamb and pork when competing with products from concentrated animal feeding operations); difficulty achieving the economy of scale for profitable production (especially when a farm is committed to organic agriculture); and that, for farmers who promote altruistic and public-welfare goals (such as environmental sustainability and community engagement), these activities are not profitable, and actually add costs.

2) Lack of Communication

“(Communication)… It’s something we are cognizant of, something we work on...It’s something we struggle with.”(BCBSNC)

Nineteen out of twenty-three interviewees (81%) mentioned lack of communication as a challenge. Lack of communication can be generally understood as people or organizations not fully aware of others’ actions or plans and fail to understand how the work of different entities can align and collaborate. One organization offered:

"In a place like Durham with such a long history of social engagement...once something new starts, there a tendency to ask ‘how am I'm gonna survive,’ and it could be difficult to see everyone else that is going on around you." (Community Food Lab)

Organizations that work in the same area of focus in the food system may neglect
communicating with each other. Two interviewees mentioned organizations “are not talking to each other, don’t know about each other and aren’t collaborating, particularly.” (End Hunger Durham). Since these organizations work in the same field, they are likely to do replicated work, and instead of providing support to each other, they could be divided, “dilute the water” and “reinventing the wheel.” (Reinvestment Partners)

Three interviewees spoke of a lack of communication between organizations that work in different fields of focus in the food system. One talked about the disparity between the goal of organizations that focus on environmental sustainability and organizations that focus on hunger and food affordability. Another mentioned the disconnection between organizations on food production and organizations on food distribution, saying “I don’t know what they’re doing. We don’t have it networked well enough” (End Hunger Durham). A third echoes the second by describing a scenario where:

"[There is] a disconnect between a farmer’s market that had bountiful food, where it was actually going to waste at the end of the market, while less than a mile down the street a food pantry never served any fresh food to the really large community of people in need." (FPAB)

Lack of communication can also happen between individuals working in the same organization. One actor spoke to the reduced price school lunch program, saying that staff working on nutrition programs and staff working on other aspect of the schools have “almost no interaction,” and that “School managers have relatively nothing to do with the teachers and other staff, and there is a lot of feeling of divide.” (Center for Advanced Hindsight)

One interviewee mentioned the lack of communication between organizations at different hierarchical levels, meaning there was disconnect between grassroots organizations and state level organizations (BCBSNC)

While no one reason was identified by the majority of actors, four interviewees mentioned the challenge of finding meeting time that could allow the participation of representatives from various sectors.

Three interviewees mentioned that the lack of diversity in the leadership of the food system contributes to the fact that certain population groups and sectors are underrepresented.
People of color and restaurants are identified as the underrepresented groups.

"The food system is run by a very small number of very large players. That’s true on the farming side, agribusiness, that’s true on the side of food service."

(Farmers Foodshare)

"If you go to a sustainable food conference, it’s always the same people. It’s often not migrant farm laborers; It’s often not that many people of color." (Center for Advanced Hindsight)

Two interviewees observed that with the constant change of leadership and overturn for projects within organizations, too often new initiatives will be introduced without adequately understanding what has already been done and, therefore, there is a tendency to replicate efforts. Two interviewees mentioned that inadequate understanding of the role and position of the organizations leads to a lack of communication. Other potential reasons behind the challenge of lack of communication include: people using different communication channels; food organizations have different perspectives and approaches to their work; and the challenge of ensuring the authenticity of communication between actors.

3) Social Context and Policy

“We are kind of swimming upstream against a lot of big policy issues.” (Farmers Foodshare)

Seventeen out of twenty-three interviewees (77%) mentioned they were confronted with challenges generated from the social and policy environment both in Durham County and in a broader society. The food system is very subjected to changes in policy. Five interviewees recognized food system is sensitive to changes in agricultural policy, subsidies, and changes in government leadership, while two of them claimed, due to this sensitivity, it is difficult to reinvent the model of a successful food system elsewhere. “Any sort of switch in politics or switch in people over departments could change what we get,” according to Durham County Health Department.

Social Division in Race, Gender and Income
Within Durham County specifically, one actor observed that “Durham has some significant challenges because there is this great divide” (BCBSNC). Six organizations mentioned they noticed different forms of social division in Durham County, making the creation of an equitable food system a challenge. The social divisions discussed are rooted in racial, gender, and income issues. Two interviewees mentioned that people of color were underrepresented, with one expressing that “white supremacy culture” still makes up “the broader mainstream culture of the society” (Earthseed Land Cooperative). Two female farmers mentioned that they encountered “push back from the guys” (Bull City Farm) and that the majority of the population (“90%”, according to Down2Earth Farm) in the farming business is men, creating a less welcoming environment for women farmers.

**Aging Farmer Population**

The second most often mentioned social challenge identified within Durham specifically is the aging farmer population, which was mentioned by 3 actors in both for-profit and government organizations. These interviewees think the farmer population is downsizing because of age, and also because not enough incentives have been created for the younger generation to start careers in farming:

"Twenty years ago in Durham County there was agriculture education in every middle school and high school in the county. And now there's only one middle school and three high schools that have agriculture education. So the training at middle school level, which is so critical to people who are growing up and making that decision one way or another, is just not there." (DCSWCD)

**Decreasing Land Availability**

Two farmers complained about decreasing land availability, whichparallels other interviewees’ comments on rising land prices. One interviewee claimed that increased land prices are reflected by the lower acreage of land ownership per capita in Durham County as “compared to Lenoir County”. It is especially difficult for young farmers and new farmers to get access to land, and they are forced to take loans to acquire adequate land for their farming operation (Funny Girl Farm).

**Increasing Food Price**
In addition to the cost of land, the increasing food price was also identified as a local issue, as people with lower income face increasing burden from purchasing food. End Hunger Durham expressed the opinion that the Durham County government had not paid enough attention to “poor people who can’t access healthy food,” saying, “…there's no agency in the Health Department that worries about that. There's no agency in the Durham Social Services or anywhere else in the government that worries about that.” (End Hunger Durham)

While Supplemental Nutrition Assistance Program (SNAP, or “Food Stamp Program”) provides food purchasing assistance for low-and-no-income people, one interviewee commented SNAP as being “rigid”. It is required by USDA that able bodied adult shall not receive SNAP for more than 3 months if she/he does not work or participate in a work program. The interviewee commented although this cut-off limits the financial burden of aiding those who are reluctant to work, this policy is biased since there are fewer jobs in rural area where there are more people of low income (End Hunger Durham)

Beside social challenges identified within Durham County, interviewees also acknowledged that local policy issues are often associated with social and policy context on a broader scale. Loopholes in federal level policies like agricultural subsidies, food stamps, and healthy diet policies were mentioned as specific challenges. End Hunger Durham summed up the broader policy issues as part of a general distrust of government: “We’re also in a time when government is seen as the problem” (End Hunger Durham).

**Over-subsidy in Food System**

Interviewees articulated concerned about the misallocation of subsidy in food system: While industrialized agricultural production has been over subsidized, individual farmers and practices in promoting healthy eating does not receive adequate subsidy.

Three interviewees from farming and research institutes mentioned that the food system currently is artificially subsidized, meaning that food prices do not reflect the actual value of food or the cost of its production, especially the external costs to the environment and natural resources from industrialized food production. One actor professed, “We don’t pay for the environmental degradation that CAFOs produce.” (Center for Advanced Hindsight)

However, when it comes to healthy food, interviewees expressed that there are not ample
subsidies for farming practices or projects that promote health food choices. This allegedly shortsighted food policy is identified as “making unhealthy food very accessible.” (FBP)

“how does someone like us, who is trying to get a fair market value for food, compete with farmers who are heavily subsidized? If you took away our subsidies, we're not going to be able to sell." (Down2Earth Farm)

4) Lack of information

“How was I supposed to know [the grant application] was supposed to be formatted this way without spending 500 bucks to go take a course?” (Bull City Farm)

Lack of information was recognized by eleven out of twenty-three interviewed actors (50%) as a challenge, across sectors including farms and food businesses, government departments, and nonprofit organizations. The interviews reveal that lack of information takes different forms, including lacking the capacity to evaluate impact, lacking professional skills and opportunities for corresponding education, and lacking access to other existing information.

Impact Evaluation

According to interviewees, impact evaluation could be primarily used for communicating with funders to attract sustainable funding. It is essential in directing the strategic plan of the organization. Impact evaluation also creates motivation for staff. Six interviewed organizations, across sectors claimed that they lack the capacity to evaluate the impact of their programs. Specifically, interviewees expressed the need for program monitoring and evaluation tools that are able to quantify impacts, instead of merely gathering qualitative data such as quotes from survey responses. Five of these six interviewees mentioned quantified impact will be more effective when communicating to the funders and program partners, as opposed to anecdotal evidence, because “it's hard to put that in number for funders." (East Carolina Organics)

One actor who works with the Durham Public Schools mentioned:

"A lot of people in schools would like to see a test score which is tied back to evaluation pieces, but we haven't really figured out a good way to evaluate how this impacts students back in the classroom. We see a 7% increase in test scores,
but there's no way to track whether it is (and how much of it is) from our education workshops. Our challenge is to prove our benefits to the school.”

(DPS Hub Farm)

Another interviewee talked about their challenge of measuring impact, saying:
"We have a ‘Farm to Food Bank’ project that is incredibly exciting, but we don't have the capacity to study how it is impacting the overall public health and health awareness...we would love to study the job creation, the economic stability that this project may be helping, the environmental impact of rescuing the food waste, as well as who are the recipients of the food, the farms producing the food. Being able to quantify the critical math of the population and the impact is challenging and the best thing we can do is create a solution that really works, that you can capture [the impact] and point to all officials that come and visit, provide 5-minute video clip about the impact it has." (IFFS)

**Lack of Business Skills**

Besides information related to impact assessment and evaluation, the lack of skills and knowledge related to business operations was identified as a challenge by four interviewees. All of them mentioned the challenge to develop business to some extent, while two farmers specifically discussed the challenges related to grant-writing, including the uncertainty of costs and benefits related to attending grant-writing workshops:

"There are a whole bunch of hoops and I never knew how horrible that was." (FPB)

"I've never done grant writing. You take a series of classes but it's always difficult because there’s never one-on-one help. Everybody in the class has their questions. It's really difficult to get your questions answered...But then how was I supposed to know it was supposed to be formatted this way without spending 500 bucks to go take a course?" (Bull City Farm)

**Understanding of Farming Science**

Three farmer interviewees mentioned that farming involves understanding of science, especially of biology. These interviewees elaborated on the science knowledge involved based
on their specific farming products, e.g. “How to manage your weeds and pests brings in entomology and all these different sciences” (Down2Earth Farm). However, none of them mentioned being challenged by this requirement of understanding farming science.

Interviewees also talked about other aspects of business management where they were challenged by a lack of information. This includes relationship building with business partners, strategic plans, and access to information about policy changes. One stated, “Some people don’t even know you can get tax break on property if you’re doing farming” (Bull City Farm)

While most of the interviewed organizations talked about the challenge of lacking information from an individual perspective, five actors also talked about how lack of information affects the Durham County LFS as a whole. Three mentioned frustration that there is information in existence that could be used to advance the LFS, but is not broadly shared, captured, or utilized:

"Some institutes came and researched and had some pretty good findings, but [those findings] have not been pulled together and have never been shared back with anyone." (Community Food Lab)

Three interviewees also expressed that some organizations, despite their effort to play an active role in the Durham LFS, have not been well recognized. One farmer had never heard about the local food policy council (DFFN), despite having apparently joined “every listserv” related to their business and feeling well-connected to information sources (Down2Earth Farm). Another actor talked about their own organization not being known by target consumers, saying:

"A lot of people just didn't know for a long time there was a farmers market. It was really frustrating because we put it in newspapers, we wrote articles, we've done NPR ads, we've put fliers up everywhere, still they didn’t know about us." (Piedmont Conservation Council)

An organization’s capacity to share their own information is often directly related to their level of connectedness and communication with other actors, all of which is related to the size and capacity of their staff.

(5) Short of Staff/Staff Hours
"We have the resources, it's just that we don't have anyone to really put it in place."

(DPS Hub Farm)

Eleven out of twenty-three interviewees (50%) mentioned shortage of staff as a challenge, with one farmer and one nonprofit acknowledging it as the biggest challenge they are facing. The challenge is generally described as lack of staff time which constrained the organization's capacity. Few interviewees elaborated on the need for more staffs in their organizations, which include managing intellectual resources by taking records or creating digital profiles (“I hardly had time to devote to sitting beside the computer eight hours a day”, according to interviewee representing DPS Hub Farm), maintaining physical properties (“It's hard to keep this property with only two staff that are part time”, according to interviewee representing DPS Hub Farm), managing the organization’s outreach and relationship with partners as well as target population:

"With our staff capacity, we now only can have thirty students at max at one time (for the farm educational workshop). The more educators we have, the more students we can reach." (DPS Hub Farm)

Some of the nuances of this challenge include the discrepancy between full-time staff and part-time staff. Interviewees acknowledged that volunteers can help fill the gaps when there is not enough staff to adequately run activities. but some organizations (including both nonprofits and some for-profit farms) rely heavily on volunteers:

The donation station program has hundreds of volunteers, and the equivalent of over four full time positions that are completely staffed by volunteers. (Farmer Foodshare)

**Short of Experienced Farmers**

Three out of the total six farmer interviewees mentioned farms were challenged by short of farmers. One of the farmers mentioned "We don't have enough staff hours to get things done, and that's universal in farming" (Funny Girl Farm). It's worth noticing that all of them recognized the decrease of farmer population as the underlying reason. According to the interviewees, farming is not attractive to potential employees, especially those of younger generation, as it is labor intensive and is not generally profitable.

**Limited Budget for Recruitment**
Two organizations linked the shortage of staffs to the challenge in seeking funding. One farmer interviewee mentioned, "We are actively looking at the budget to see how we could make room for one more full-time person” (Funny Girl Farm), which implies the budget for recruiting is tight. The other interviewee from an NGO said "Donors and grantors would prefer not to pay for the salaries with the funding they provided." (SEEDS)

The cost of labor is also generally identified as the reason why organizations are short of staff, particularly for farm businesses: “The biggest cost obviously is labor. It's really difficult to pay a good wage and be able to support those jobs by selling the food.” (Funny Girl Farm)

6) Other Challenges

Within the interviews, actors also mentioned a variety of other challenges, some of which were very specific to their own organization’s situation, and others that were too vague or broad to be contained within one of the other identified categories. One such issue includes timing and logistic challenges, such as finding an appropriate time and place to hold a meeting with many different actors. However, it can be difficult to separate out challenges as distinct problems, because, as some interviewees acknowledge, the lack of time relates to being short of staff and financial barriers:

"I think the biggest number-one challenge is we feel like we don't have enough hours here to get done what needs to get done. ...And so we are actively looking at the budget right now to see how we can make room for one more full-time person here." (Funny Girl Farm)

The complex and interconnected challenges facing the actors within the Durham LFS can be seen as a result of concrete needs, which are discussed in the next section.
Needs Assessment

“There is a need for a strong umbrella organization to not only work on the policy side, but also on the information sharing and provide plug-and-play lessons as a more approachable ways for local organizations to learn and share.” (Eastern Carolina Organics)

Since the primary research question of this exploratory study is to find out how WFPC and DCF could most effectively support local food system, we asked interviewees “Where could you see Duke entities playing a helpful role?” Here we articulate the needs of the interviewed organizations based on their responses to this question.

Eight interviewees (35%) spoke of Duke’s “convening power,” expressing the desire for an organization that will facilitate connections among LFS actors. However, one nonprofit actor pointed out that “partnership is time-consuming,” and that collaboration does incur a cost on the participating organizations:

"If they are going to help fill gaps, that has to come with funding to support the organizations’ learning how to do that and having the staff capacity to do that...If you're going to ask us to partner and to work together more, facilitate that with education and funding. Make it easy for us to do that, because we want to." (SEEDS)

One actor also specifically identified the need to “focus more on broadening the conversation and bringing in people who are not often spoken of at conferences” (Center for Advanced Hindsight), noting that facilitated communication could also provide a means of beginning to address the issues of inequity within the food system.

Six interviewees discussed the need for an institutional “hub” for information. Actors suggested that it would be particularly helpful is an institution could gather input from farmers into one place, or actively map LFS resources and assets within Durham. Other types of informational needs include policy analysis and assessment data:

"Making food policies really...transparent and supportive of local ag. Each county right now has such different policies around what type of business you are, food safety, all that type of thing." (Funny Girl Farm)
"Obviously Duke has research power, and getting hooked up with the right efforts going on in town to...provide that evaluation component." (Reinvestment Partners)

But interviewees also made it clear that any institutional information hub should ensure that information is shared and made accessible to those who need it:

“Developing...communication structures that link Duke's intellectual assets, primarily student projects, to Durham’s food system needs.” (Community Food Lab)

When it comes to acting as a “hub,” several interviewees identified the potential for Duke entities to facilitate connections not only between actors but between actors and resources. Four actors specifically acknowledged the need for greater connections to existing grant funding. Student volunteers may also be seen as a resource that Duke can provide. Eight of twenty-three interviewees (35%) brought up the potential for student volunteers to fill needs related to farm labor, leading educational programs, research expertise, or skills like communication, business, finance, and sales/marketing.

One other need that five interviewed actors noted is the potential for local food purchasing at an institutional level. During the course of the interviews, actors tended to discuss some needs that lie outside the scope of what Duke entities could address. We recognize that these comments are beyond the scale of intervention recommended for our clients, but we chose to report the information to provide a more robust context for our clients’ understanding of the Durham LFS.

Three interviewees expressed the wish to have a coordinating body that oversees the food programs, organizations, and networks in Durham County, be it a full-time staff person or a department in the local government. Until now, the main steering departments in the Durham government include: the Department of Social Services, Food and Nutrition, which primarily works with food stamp programs and provides assistance to individuals and families in purchasing food; and the Durham County Department of Public Health, which runs the Healthy Future for Durham Schools program to enhance nutrition and health of the students and provides nutrition counselling to the schools. However, one interviewee expressed the opinion that the government should “be doing a lot of things that local food organizations are doing right now
and take more responsibility to fill the gaps that leave people hungry.” (End Hunger Durham)

It is reported that the areas of focus that have been neglected by the government include food distribution, food supply (including food pantries), and health. In addition to local nonprofits that work in these fields, having a department or full-time staff in the county government would have the advantage of overseeing local food network from a neutral standpoint. Such leadership would also provide better access to staff power, financial resources, and technical skills, like the ability managing a website or electronic database of information, which were noted as capacities that are currently lacking among organizations within the Durham LFS. However, one government actor spoke to this expectation by saying that the disadvantage of having such body within the local government is that “it’s hard to do advocacy work under the government” (Durham County Health Department) and suggested that a stand-alone organization in partnership with the government could potentially be a better option for providing coordination and convening power within the Durham LFS.
Discussion

Characterizing the Durham LFS

Our exploratory study reveals characteristics of the Durham local food system (LFS) that are as of yet unpublished. The list of identified actors provides insight for our clients, and directly serves their interest in supporting the LFS. And although the majority of interviewees did not collectively refer to any single key actor, the restaurant industry in general was identified as having a great positive influence. The potential for restaurants to play a strong role in the LFS is a unique aspect of the Durham LFS, especially in contrast to the direct-to-consumer focus found in the rural communities of Alamance County (Hansen & Overton 2014). Recognizing the role of restaurants, combined with prevalence of for-profit organizations identified overall, underscores the economic value associated with the food system in Durham County, which aligns with the economic focus of the Cabarrus County food assessment (Cruze & Curtis, 2010).

The development of relationships should be emphasized when studying “local” or “regional” food systems (Feagan, 2007). The sociogram shows that primarily nonprofits and government organizations are the most collaborative actors. This finding may be due to the fact that we did not interview equally representative numbers of nonprofit and for-profit actors. The sociogram also depicts a rift between two main clusters of actors, one being mostly government and nonprofit organizations and the other consisting mostly of for-profit entities. Again, this may be reflective of our methods, in that we did not try to interview equal proportions of actors from each sector. On the other hand, our results may accurately illustrate a trend that for-profits are less likely to be involved with collaborations among nonprofit and government organizations. We suspect that different working styles across sectors may be one underlying factor that hinders collaboration and contributes to the apparent divide. As illustrated by quotes from ECO and Firsthand Foods, the business perspective is different from that of a nonprofit actor. This would likely indicate that the inherent difference in the nature of nonprofit and for-profit actors is a barrier to collaboration.

The identification of clusters associated with various missions adds another dimension to the division between groups. The distinction is particularly evident when comparing the businesses focused on agricultural production and the nonprofits focused on food access, health,
and equity. Firstly, these actors have different approaches to how their organizations are run, and, secondly, their work is often driven by different purposes. These confounding factors contribute to the scattering of information described by Lamie et al. in their call for collaborative assessment (2013). The DCADFPP may be seen as an example of the partitioning of information associated with the clustering of actors: the DCADFPP is explicitly focused on the business of agricultural production, and while the report is publicly available, its original purpose was to provide guidance specifically to the FPAB. This does not align well with the “collaborative approach” to LFS assessment or the “coordinated efforts” recommended in the literature (Curtis et al. 2010; Lamie et al. 2013).

Collaboration Within the Durham LFS Network

The indication from CEFS’ state action guide is that community food councils can be the driving force for collaboration and bring scattered information together (Curtis et al. 2010). But according to multiple interviewees, the Durham Farm and Food Network (DFFN) is not effectively performing this function yet:

"Unfortunately, I think...people are excited but they don't really know what they're asking for, or there's not a- I have a hard time understanding what their value proposition is, into the scheme of things." (Reinvestment Partners)

"I signed up for all the initial stuff and I haven't made it to a single meeting."

(Funny Girl Farm)

"Yeah it's a struggle...it had a lot of energy behind it and then it took so long to get started a lot of the energy and the initial players dropped off. Like I did, and a lot of other people stopped going just because it took a really long time to get started up. And then a lot of people who are left are passionate community people but they're not the key players who are doing it for their job, so they don't have a good mix of key players and community people because they have all the meetings in the evening." (Health Department)

But there are certainly instances in which actors are engaging in productive, coordinated efforts outside of DFFN, such as the collaborations between certain farmers and local restaurants.
As was found in the Cabarrus County Food System Assessment, informal social relationships are key for developing direct collaboration between food producers and restaurants (Cruze & Curtis, 2010), and this is certainly the case for actors in the Durham LFS as well. Effective coordination is also evident among actors who provide educational programs:

"So [SEEDS’] main focus is after school education...Hub Farm's focus is really to get field trips...Our focus is to be in the schools, and then the county works in all of those ways. It's kind of this patchwork of what I can tell, making sure that every school is covered in some fashion." (IFFS)

Within each of the two main clusters of Durham LFS actors, there are examples of coordinated efforts and strong collaborative relationships. The most obvious gap in the network would be the divide between these clusters. And as far as the missions represented among identified network actors, certain issues are underrepresented: food access, health & nutrition, social equity, and policy/advocacy are aspects of the Durham LFS that could use more support.

**Needs and Challenges**

Rifts in communication are implicit within the SNA portion of our analysis, and the responses from interviewees corroborate the challenge of lack of communication. This finding is in-line with what has been reported in similar LFS assessments, as communication was one of the key persistent challenges identified in Alamance County (Hansen & Overton 2014). It is interesting to note, however, that fewer than half of the interviewed actors offered any deeper observations on the proximate factors that may lead to a lack of communication. The previously discussed divisions within the social network offer some insight into how lack of communication arises. But considering the concerns around equity within the food system, we suggest that a further analysis of power among actors within the Durham LFS may shed more light on the ultimate root causes underlying the lack of communication.

The interconnectedness of the identified challenges cannot be understated, particularly when it comes to financial barriers and the majority of other challenging situations, especially being short of staff. SEEDS articulated how this combination of challenges is particularly apparent to nonprofits that rely on grant funding: “...you're dealing with an industry whose
donors and grantors would prefer not to pay salaries if they can help it."

And when it comes to financial barriers, there are different ways to interpret a perceived lack of funding, because an organization’s capacity to access funding is distinct from the amount of funding that may be available. This is to say that the lack of skills or information may actually be underlying financial barriers.

Finally, while financial barriers are certainly linked to many other challenges, we must recognize that money alone does not solve problems. The most helpful analysis that we can provide for our clients and for all of the actors within the Durham LFS to understand specifically where to resources (i.e. money and time) should be spent in order to most effectively address the less tangible challenges within the network.

Limitations, Uncertainties, and Recommendations for Future Research

Given time constraints of our study and limited capacities of our two-person team, there are gaps and uncertainties in our results. The first major point of uncertainty is that, due to our method of snowball sampling, there may very well be LFS actors that were not identified because they are completely isolated from the network that we identified. Additionally, because we made the decision to define the LFS as specifically based within the political boundaries of Durham County, there may be influential actors that are not included within our analysis because they are located in neighboring counties. (For example, a number of farms located outside of Durham County were mentioned as collaborators with Durham-based organizations.)

The sociogram is constructed from interview data that refers specifically to one organization collaborating on a project or program with another named organization. Since we relied solely on self-reported collaborations among the actors we interviewed, it is likely that there are collaborative relationships among actors that are not depicted here, or that the degrees of connectedness identified in our report do not reflect the actual state of the network. We expect that we are missing relationships between organizations that were not interviewed (such as CFSA, Prodigal Farm, or Bull City Burger). We acknowledge as well the self-reporting of challenges and needs -- some of the claims made by interviewees are difficult to fact-check. But as ours is the first known study to attempt to characterize the network of the Durham County
LFS, we are confident that our results provide, at least, a thorough baseline for future study. This baseline data is a key tenet of effective LFS evaluation, as described by Lamie et al. (2013).

Our project establishes a strong framework for further research into the Durham LFS, and as SNA is most effective for demonstrating changes over time (Christensen & O’Sullivan, 2015), we recommend that future projects continue to expand our efforts. In the future, a more robust sociogram could be created by incorporating information gleaned from organizations’ websites. And we urge future researchers to seek out actors that may be isolated from the current network, in order to ensure that the efforts and concerns of marginalized actors are included in future assessments.

Christensen and O’Sullivan also acknowledge that SNA cannot serve as a primary evaluation method for LFS:

“As an evaluation tool, SNA is probably a third or fourth-tier strategy. Many local foods programs and projects do not evaluate their efforts at all. When evaluation does occur, it is often very cursory; perhaps a written participant survey or interview is conducted...Depending on the individuals responsible for the evaluation, they may or may not be aware of SNA or have the capacity to conduct one. Evaluation efforts need to be more incorporated into food system work.”

Further evaluation of the Durham LFS should be a priority. This could be included in a more traditional assessment, which would provide a more thorough inspection of the for-profit entities within the system, separated by their role in the food system (Cruze & Curtis, 2010). Lamie et al. offer examples of quantifiable measures for evaluating the economic impact of LFS, which would be useful in future analysis of this network (2013). We recommend that these evaluation efforts should be conducted by a competent central actor (or a coalition of central actors) and that the data should be made as accessible as possible.
Recommendations to Clients

In response to our primary research question, we have prioritized three areas of focus that we recommend to our clients:

1. **Communications**
   
The World Food Policy Center (WFPC) and the Duke Campus Farm (DCF) should consider the facilitation of connections between actors within the Durham local food system (LFS) who are not currently connected. The development of relationships between our clients and specific actors seems critical. If they are not already connected, we recommend that our clients reach out specifically to the Durham County Farmland Preservation Advisory Board, the Durham Farm and Food Network and Firsthand Foods. It would be ideal to establish a portfolio of relationships that accurately represents the proportions of different sectors within the Durham LFS network, which would include at least as many for-profit actors as nonprofits.

   Additionally, we recommend that a representative of the WFPC staff plan for quarterly conversations (either in person or by phone) in order to maintain a satisfactory relationship with participating organizations. These conversations need not be long or in-depth, but their consistency might model commitments to intra-organizational communications.

   As far as building the capacity of LFS actors to communicate better among themselves, we recommend that the WFPC provide educational workshops or webinars focused on specific topics that will help organizations learn to communicate about food systems issues from different perspectives. To further strengthen relationships within the network, it would be ideal if these educational offerings are conducted in conjunction with other Durham LFS actors. Based on the needs and challenges identified by interviewees, we recommend that the topics of focus should include: 1) an introduction to equity; 2) tips for developing business partnerships; and 3) how to engage in long-term relationships with funders.

   To be clear, we do not recommend that the WFPC or DCF play an active role in actually coordinating the activities of the Durham LFS. We fully recognize that the WFPC have their own capacity limitations, and it would be inadvisable to suggest that our clients offer more than can be realistically achieved.
2. **Evaluation**

   In addition to previous researchers having identified the need for better evaluation of LFS, our interviewees clearly articulated their concerns regarding the link between impact assessment and access to funding. Thus, we recommend that the WFPC could support efforts to provide evaluation or baseline data for the programs and projects that Durham LFS organizations are currently running. This support could come in the form of instructional resources (including an organized compilation of pre-existing resources) like workshops, webinars, or written documents.

   Another possibility is that the WFPC could facilitate projects where graduate students could be paired with a LFS actor to provide them with data related to the impact of a certain activity. Similar to facilitating communication and access to information, the results of these projects ought to be made to be as accessible as possible.

3. **Policy Analysis**

   Since the WFPC is housed within the Sanford School of Public Policy, and the Durham LFS is currently lacking a policy focus, it is conceivable that our clients could provide policy expertise. WFPC might provide information to address local policy issues identified in interviews, such as the nuances of property tax codes that relate to agriculture and food production, the regulations surrounding institutional food purchasing, or the public recourse for addressing hunger in Durham County. This information could be produced from projects that partner students with local organizations. And, as with any other information, these should be publicly accessible.

   This report has provided the information and analysis that WFPC and DCF require to better engage themselves with local food system. As the two pioneering organizations that lead food system research and actions in Duke University, WFPC and DCF are in a unique and privileged position to mobilize resources, convene communication and promote research. Both WFPC and DCF are young organizations, so are many of the food-related local organizations in Durham County and local food system studies in the region, and tackling the multifold
challenges facing the local food system can be a difficult task. Yet if the resources and efforts are targeted at the most urgent demand of the local community, as identified in this report, both of our clients have great potential and capacity to be the guide on the side and be the driving force of local food system development.
References


Appendix I: Interview Protocol

Recruitment Script

We will send this message in an email to make contact and schedule the interview.

Hello, my name is ______________ from Duke University. I am part of a team of graduate students in the Nicholas School of the Environment and we are partnering with the Duke Campus Farm and Duke World Food Policy Center for a research project. We are conducting interviews with local food organizations to learn more about how these two Duke entities could potentially integrate with the local food system in Durham.

We would appreciate the opportunity to interview you/your organization for our study. Would you like to hear more about our project and learn how you can participate?

Verbal Consent Script for Durham Local Food Organizations

This is how we will begin each interview.

As we communicated in our emails, we are conducting interviews in order to gather information on how our clients within Duke University could play a role in supporting the local food system. We are interviewing a wide range of people and organizations to gain a broad perspective on the local food system, and we would like to include your views our study. [You/your organization was recommended by members of the Durham Farm and Food Network as a key actor in the local food system.] The interview will consist of questions pertaining to the structure, characteristics and commitment of [you/your organization] as well as what further connections and support you would like to see to be built. This interview will take approximately an hour of your time.

Your participation in this interview is completely voluntary. Your responses will be used towards a research report and a presentation that will be available to the Duke University community and the public. You may be quoted in our research report/presentation and you may
be identifiable due to characteristics such as your position title and your organization. You may stop your participation at any time during the interview. You may choose to be anonymous. If you would like to request that something is off the record, we will not include it in our report or presentation.

Finally, with your permission, we would like to record the interview in order to focus on our conversation instead of taking written notes. The recording will be preserved until the end of the research study. Once the study is complete, the recording will be destroyed. If you have questions or concerns regarding this research, you can contact Tianshu Sun at tianshu.sun@duke.edu, or Laura Marie Davis at laura.marie.davis@duke.edu. If you have any questions about your rights as a participant in research you may contact the Internal Review Board at 919-684-3030 or campusirb@duke.edu.

“Do you have any questions?”
"Do you agree to voluntarily participate in this interview process?"

[ ] Yes       If Yes..... Continue
[ ] No        If No...  Good-bye.

Outline of Interview Questions
1. Tell us about your organization and your role in it.
   - What type of organization is it/ Which sector does this organization belong to?
   - What is your mission? →(May lead into drivers & barriers)
     - What is the scope of your work?
     - Who are the primary population you serve?
     - How big is your organization? How many members/staffs?
     - What is the structure and leadership like?
     - Are your members (and staff) representative of the population that you serve?
   - Where do you get your support/funding?
   - What are some of your on-going projects?
○ What are some future projects?
● Does your organization have a strategic plan?
  ○ Where do you see your organization in 5 years? 10 years?
● Do you have regular meetings? What are they like?
● Do you participate in any advocacy activities?
● Do you share materials with any other groups? (Or website, or fundraising?)

2. Drivers and Barriers to achieving mission:
● Describe one of your organization’s biggest successes or achievements.
  ○ How do you measure your successes?
  ○ What helps you succeed?
● What challenges have you faced?
  ○ Training needs? Outreach? Fundraising?
● What motivates you/your organization?
  ○ How do the programs you are running relate to these motivations?

3. Tell us about your role in the Durham County food system:
● Who do you work with? Partner with? Connect with?
  ○ How did you become involved with DFFN? How long have you been involved?
  ○ What do you see as the benefits and challenges of working with this group?
● Do you work with volunteers? What are the sources of volunteers?
● Who do you think are the movers/shakers in local food system in your opinion?
● What other organizations would you like to work/partner/connect with?

4. Possible Technical Assistance from Duke or other organization/institution
● Have you (your organization specifically) been in partnership with any institutes or research organizations?
● Where could you see Duke entities playing a helpful role, either for your organization specifically or for DFFN?
5. Is there anything else you’d like to say, or anything else that we should include in our study?

Thank you so much for your time. We will be sure to let you know when our final report is complete, and we will invite you to our presentation at the Master’s Project Symposium in May! We may follow-up with you between now and then if we need clarification or any additional information.
Appendix II: Node Structure

- **Activities and Plans** - long-term or short-term programs, activities, or projects within the organization being interviewed
  - Programs or Projects - examples of either past or current efforts
  - Planning - strategic planning or specific goals for future programs
- **Challenges** - needs or barriers, or things that are lacking. May be general or not included in a child node.
  - Financial Barriers - not having enough money, not having access to funds
  - Infrastructure Shortage - not having space or equipment
  - Knowledge Management Challenge - struggling to organize information
  - Lack of communication - when one organization is not aware of what another organization is doing
  - Lack of information - needing basic information or facts not related to the actions of another specific organization
  - Lack of skills - not having a specific technical ability or capacity
  - Short of Staff - not having enough people in an organization
  - Social Environment
    - Government Inaction
    - USDA Certification
  - Time and logistic challenges - trouble organizing meetings or getting things done in a restricted time frame
  - Unpredictable market - difficulty selling a product or setting prices
- **Dump** - Anything that seems like it should be coded but unsure of where it fits.
- **Examples of Programs** - examples or models of programs from others
- **Good Quotes**
- **Key Players** - names of specific organizations who are identified by interviewees as leaders or influencers of the local food system
- **BCB** - Bull City Burger (owned by Seth Gross)
- **BCBS** - Blue Cross Blue Shield (company or Foundation)
- **BCC** - Bull City Cool food hub
- **CEFS** - Center for Environmental Farming Systems
- **CFSA** - Carolina Farm Stewardship Association
- **Co-ops** - The Durham Co-op Market
- **DCHD** - Durham County Health Department
- **DFFN** - Durham Farm and Food Network
- **DPS** - Durham Public Schools (includes Hub Farm)
- **Duke** - Duke Hospital, Duke University, or any affiliates, or general references to an unspecified Duke entity. (Includes Duke Campus Farm)
- **ECO** - Eastern Carolina Organics
- **EHD** - End Hunger Durham (Betsy Crites)
- **Farmers Market** - The Durham Farmers Market
- **FB** - Durham Food Bank
- **FC** - Food Corps
- **FF** - Farmer Foodshare
- **FHF** - Firsthand Foods
- **Ford Foundation**
- **FPB** - The Farmland Preservation Advisory Board (Farm Board)
- **IFFS** - Interfaith Food Shuttle
- **NRCS** - Natural Resource Conservation Service (USDA)
- **RAFI** - Rural Advancement Foundation International
- **Restaurants and Caterers** - general references to the restaurant industry
- **SEEDS**
- **STS** - Seal the Seasons
- **Young People** - general references to youth

- **Mission** - mission statement, drivers, goals, motivation
  - **Education**
○ **Youth**
○ **Health/Nutrition**
○ **Food Access/Hunger**
○ **Agricultural Production**
○ **Environment**
○ **Organizational Capacity** - may include economic sustainability

- **Recommendations** - suggestions or ideas about what could be done to support the local food system
  - **Community actions** - recommendations referring to grassroots efforts or the actions of community members at large
  - **Duke** - recommendations for the role that Duke entities could play
  - **Firm/for-profit actions** - recommendations for businesses, either specific actors or industry(ies) in general
  - **Gov action** - recommendations for governmental actors
  - **Organizational actions** - recommendations referring to the role of a non-profit actor or other organizations in general

- **Relationship** - any specific name of another specific organization that is considered to be a partner, mentor, supplier, customers, etc.
  - **Casual** - any casual interaction between/among organizations, without commitment or engagement in mission or activities. Includes “mentions”
  - **Collaboration** - working together on a specific program or project; includes funding, and serving as a board member.
  - **Competition**

- **Resources** - when an organization refers to some kind of capital that they use
  - **Financial Resources** - talking about money or financial structures (grant funds, gov funds, fee for service, etc.)
  - **Human Resources** - volunteers or staff
  - **Intellectual Resources** - Knowledge management and/or Sources of information AND experience level- how long an organization has been around, or had
leadership in place, etc.

- **Physical Resources** - talking about land, machinery, tools, office or meeting space, etc.
- **Social Resources** - talking about relationships in general, without specific names

**Scope of Work** - a description or attributes of the customers, audience, patrons, or consumers of the product or service, including the geographic scale.

- **Durham County**
- **Within Triangle Region**
- **Outside or Larger Than the Triangle Region**

**Successes** - statistics or outcomes from a specific action - attached to appropriate Case Nodes if necessary

- **Measured** - any statistics, reporting, etc. -- can include client feedback (as qual meas).
- **Anecdotal** - R notes success or demand for services w/out counts, data, or client feedback, observed but unmeasured success

**Unanswered Questions**