Linking the Triad Food Network: Creating a comprehensive online communication system for the Piedmont Triad local food community

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Introduction

The health of a community's food system is an important indicator of its vitality and sustainability. A logical and appropriate way to revitalize a community is through the development of a local food economy and network. People throughout the United States are designing and implementing sustainable, local food systems that are rooted in particular places, aim to be economically viable for farmers and entrepreneurs, use economically sound production and distribution practices. Our team researched a variety of innovative strategies and online campaigns that are currently underway and created plans for a comprehensive food network for community leaders and interested citizens to link their own local food systems. We are setting the stage for older generations to utilize the communication tools established by newer generations. We must eliminate the existing stigma between agriculture and online outreach. If implemented correctly, online food campaigns, mobile applications and online advertisements are instrumental business tactics for entrepreneurs to better connect within their local food communities.

The majority of the food we eat is delivered using a global, commercial food system. The efforts to create local food systems are not aimed at supplanting the current system, but rather, diversifying it. Local food systems improve the local economy. They are associated with the following factors: To preserve open space; to promote locally adapted seeds that conserve water; to conserve energy and labor; to train and support the next generation of farmers; to reduce air pollution; to provide more nutritious foods and to create social capital. The most common barriers with local food systems include a shortage of land and producers; insufficient local food processing businesses; and a lack of guaranteed markets. Convenient, affordable

markets for buyers and efficient, guaranteed markets for farmers are critical for promoting

local food systems (Tate 2009). Although barriers to developing local food systems overlap,

economic opportunities vary based on population density. However, local food systems create

economic development opportunities for North Carolina's jurisdictions. Reaping the economic,

health, environmental and social benefits of a local food system is a long-term endeavor and

requires local government support.

Small-scale agriculture in North Carolina depends on the connections made at the local

and state levels (Andreatta 2000). The local food network in North Carolina has developed in

recent years in view of new business outlooks and the desire to reach to a wider scope of

consumers. The expansion of local food networks in NC is prompting new entrepreneurial

opportunities for niche food markets. However, with new opportunities comes the need to

revisit marketing strategies to reach a larger clientele (Day 2005). Innovative approaches to

business are the way of the future, especially for small-scale agriculture (Yeboah, *et. al.,* 2009).

Small-scale agriculture is dictated by entrepreneurial opportunities. Entrepreneurs may

choose to adopt a range of potential innovations to defray cost-benefit issues, exploit various

markets, and better connect producers with consumers in the food distribution network

(Berdegue, *et. al.,* 2008; Gauthier & Wooldridge 2011). Motivations for such adoptions will vary

according to target markets.

Entrepreneurs in the dairy niche are the focus of this study. Dairy entrepreneurs in the

Piedmont region, particularly Alamance and Guilford counties, are the interviewees for the

ethnographic aspect of the project. To focus on one, specific niche, the researchers are able to

better gage the disconnections between producers, farmers and distributors in relation to

communication. Anecdotal evidence proves to be a powerful tool in the study of food networks, especially at a local level.

The local food infrastructure of North Carolina is developing from the ground up through various organizations such as the Center of Environmental farming systems, Carolina Farm Stewardship association, the farm to school program, and the NC cooperative extension North Carolina. The North Carolina food infrastructure's success is evident through the work of organizations such as the 10% Campaign, which encourages North Carolina to take a pledge of supporting the State's local food industry by spending 10-percent of individual grocery budget on locally produced foods.

Since July 2010, over 6500 citizens and 876 businesses in the 10% Campaign network, contributing to over 53 million spent on local food since July 2010 (CEFS 2013). The 10% Campaign is a great example of an organization that works with other organizations to assist in all phases of local food distribution. These types of organizations are expanding the local food infrastructure in North Carolina and presenting entrepreneurial opportunities to local and niche food producers in the state. The scope of this research gathers information on the ways these local food producers communicate to each other and to their customers. The research will be used to improve the local food infrastructure by creating a comprehensive communication system that fits the needs of local food producers and consumers, and promotes growth in the local food infrastructure.

Our project envisions a way for entrepreneurs to connect to a wider audience using the newer generation's ubiquitous marketing tool: Interactive media. Our client, Jen Walker, has met with our team on several occasions to discuss her vision for the project. She tasked our

team to create a graphic appeal to present the information gathered on the gaps in the Piedmont's local food network. She suggested we analyze food aggregations in the 9 county regions using data from previous templates completed by Piedmont Grown and the Piedmont Conservation Council, Inc. (PCC). These non-profits work on innovative projects that promote conservation and sustainable communities in NC. Walker also advised the team to use an ethnographic approach to see how agricultural entrepreneurs market products and to gage whether these stakeholders market using an online approach. The stakeholders we identified were primarily farmers, entrepreneurs, distributors, city and council level officials, non-profit organizations, and the consumers of the Piedmont Triad. These groups are concerned with how personal businesses can thrive using an online food community as a communication tool for reaching business and consumer markets. By synthesizing the Triad food network and the anecdotal data from interviews of our stakeholders, the team was able to complete a comprehensive communication plan for an online food network.

Our project proposes an online food community using a smartphone application, complete with an interactive map to show the links between niche producers and distributors specific to the Piedmont region in NC. The goal is to create a communication roadmap to better connect small-scale farmers with distributors and consumers using a 'user-friendly' approach for an online community. The interactive map displays food aggregation areas as well as food deserts in NC. The case study focuses on dairy entrepreneurs in the Alamance and Guilford 9 county regions. We hypothesized that an online food community would be beneficial for an enhanced marketing approach for small-scale agriculture because it would inform a wider range of stakeholders. Our research supports the team's plan for this community effort.

Methodology

Our research methods involve qualitative, quantitative and analytical research techniques. To better understand the intricacies of local food communication we focused our research on the communication dynamics of a single local food community in a 9-county region in North Carolina, the local cheese community. The researchers created a questionnaire to prompt anecdotal responses to uncover communication trends amongst the community. The team produced a dairy food network map to visualize the dairy community in the Piedmont region. We conducted an analytical study of North Carolina organization and campaigns online communication tools and techniques. The team analyzed the major dynamics of communication within this local food community and labeled them into three separate communication categories: 1) Distribution 2) sharing and 3) exchange communication. Categorizing these concepts into subcategories, within a single niche, it allowed us to develop the framework of our communication system for the Triad food network.

1) Distribution – dynamics of interaction between producers and distributors in making deals, gathering information, etc.

2) Exchange – dynamics of Interaction between producers and consumers in pursuit of selling/consuming local food.

3) Sharing – dynamics of interaction between local food consumers when sharing local food information. (Word of mouth advertising)

Project Management Plan

The team's final project management plan evolved using a venn diagram (See Appendix A1) design to display how each aspect of the project hinges off the other. The plan evolved

using three research approaches. The first question we asked was who we are trying to communicate to. This led us to consider the stakeholders of our Triad food web. We focused our attention on dairy entrepreneurs to better gage the disconnections between producers, farmers and distributors. This set of information pools over into what content our team wants to communicate to the Triad food network. The team set a goal to compile entrepreneurial data of the 9-county regions into an interactive map. We are trying to bridge the gaps of the disconnection between businesses. Finally, this set of information floods into the idea of how do we communicate these findings into a comprehensive communication tool. This is where we set a goal to propose an online food network to better connect the local food community of the Triad. The overarching theme is "connecting generations," or giving older generations a system that younger generations relate to and use. The team is accentuating the user-friendly approach when planning the final proposal. This claim was supported from the analysis of the information collected from the interviews. The venn diagram accurately depicts how each aspect of the project depends on each other and comes to full circle in linking the Triad food network.

Each team member was accountable for not just their research question, but the team's overall target goals. We sought out help from professionals experienced in this area of science and work. For the interviews, Jen Walker gave us the idea to interview stakeholders involved in farm incubator projects. Then, Professor Dorsett and Dr. MacFall steered us toward the idea of focusing interviews and collecting data for the interactive map using cheese as our local food commodity. The respondents for the interviews were specifically entrepreneurs in small-scale agriculture, participants in NC farm incubator programs, and work in dairy production and

distribution. Once we focused our attention on dairy entrepreneurs we were off and running full speed ahead.

Though we had a challenging start to our project, more specifically, trying to come up with our end goal of proposing an online food community for our stakeholders, our plan is dynamic, yet interdependent on each other. We wanted to stress how important each area of research the members completed because we had no choice but to work as a team to reached our end goal. Individually, we answered the relevant questions geared for our stakeholders. Collectively, we kept in mind what our stakeholders might ask or be concerned with by implementing our project proposal. Our ideas were designed to intrigue our stakeholders, as well as those who are unfamiliar with the benefits of using an online food community for entrepreneurial opportunities in small-scale agriculture.

Local cheese data collection for interactive map

The researchers collected data to create cheese desert maps in the 9-county region to gain basic knowledge of the local food industry and identify producers to conduct for our anecdotal questionnaire. We also wanted to identify the areas of North Carolina that are least likely to obtain locally-produced food and more likely to benefit from the purposing local food communication system. This research also gave insight as to what type of information an aspiring local cheese producer would need in order to start a business. The information was used to frame the information for the interactive map and online community and smartphone application. We used this information to provide a real life example of how the local food communication system could be utilized.

The data used was accessed from the North Carolina Local Food Inventory. Cold storage aggregation and dairy production/processing centers was allocated and processed. (See Appendix B1) Data was then input into our interactive GIS software Zeemaps (see Appendix B2.1.a) Individually each data point was input into Zeemap, including details of; Name, Address, Video, Audio, Pictures, Websites, Emails, Phone Numbers, Coordinates and Directions to and from the location.(see Appendix B2.1.c) To show the interaction between the distribution Of Cold storage aggregation/ Dairy production processing centers and Local Food desert zones our group overlaid our Zeemap GIS map with the USDA Food Access Research Atlas (see Appendix B2.2)using Adobe Photoshop. This was done by saving each photo using the same aspect ratio coefficient, and Altering edges and sides of the photos until Highways and Interstates overlap. The result is an interaction map (see Appendix B2.3) contrasting cold storage aggregation and dairy production centers with relative food accessibility parameters.

Dairy entrepreneur interviews

Interviews were conducted from September to November 2013. The researchers identified sets of variables associated with small farm success through various literature, published and unpublished reports and recommendations from experts in this field of work. After the variables were identified, a questionnaire was developed as a guide for conducting the case studies interview protocols (See AppendixC1.1). Each case study consisted of an appointment to meet with researchers for either an on-site or off-site interview.

Guided by the questionnaire, farmers were encouraged to talk about their farming operations, motivation for farming, farm organization and marketing strategy. During each case study, responses were recorded electronically or manually. The recordings were transcribed

(see Appendix C2), and responses supplemented from the manual transcription, electronic communications (e-mail) and secondary sources.

The responses were compiled into tables to better analyze the data collected from the interviews. The team looked at the responses and focused on the answers about using online marketing for business purposes. The researchers used the respondents' feedback to tailor a communication proposal to meet their suggestions.

Analytical study

Our research team conducted analytical research on existing communication methods of North Carolina local food campaigns, producers and consumers. We analyzed how these entities share information over an online platform and we explored the effectiveness of these tools and techniques. We also analyzed the dynamics of communication in other environmental online communities such as focus the nation, planet forward, and 350.org to help develop an effective and comprehensive online communication system. We specifically looked at intercommunication tools and techniques within the community and social media use in engaging new community members.

10% campaign structure

Upon analyzing the data, we formulated the communication system around the 10% Campaign for quick and effective implementation purposes in North Carolina. While this framework was developed to fit the needs of any local food community, we felt it was best to utilize the popularity and dense network of the 10% Campaign for North Carolina specifically. We considered the 10% Campaign's specific goals in creating the finer touches into this specific

model thought this communication system framework can be utilized in other local food communities.

Information collected and analyzed

The team identified the areas of North Carolina least likely to obtain locally-produced food and more likely to benefit from the proposed local food communication system. The success of our project was contingent on the responses of the entrepreneurs interviewed, the food desert zones identified in Alamance and Guilford counties, and the analysis of current online campaigns and social media tools to instigate creative, yet feasible ways to create an online local food community. All information collected in the field and the literature supported our original hypothesis stating that an online food community would be beneficial for an enhanced marketing approach for small-scale agriculture because it would inform a wider range of stakeholders.

Food Deserts

A complete food system includes resources, production, processing, consumption and the disposal of food, which are linked together by distribution and markets. When a lack of any number of these variables is present there is a risk that the local area could become a food desert, or already is Food deserts are urban neighborhoods and rural towns without ready access to fresh, healthy, and affordable food ("Agricultural Marketing Service Food Deserts"). Instead of supermarkets and grocery stores, these communities may have no food access or are served only by fast food restaurants and convenience stores that offer few healthy, affordable food options.

USDA's Economic Research Service estimates that 23.5 million people live in food deserts. More than half of those people are low-income. The USDA also estimates that farm-level value of local food sales totaled about $4.8 billion in 2008, or about 1.6% of the U.S. market for agricultural products. However, 12.6% of American households and 7.0% of Canadian households are food insecure (Johnson & Tadlock & Aussenberg, 2012). In low income areas the lack of access to supermarkets or grocery stores contributes to a poor diet and can lead to higher occurrence levels of diet related diseases, such as: obesity diabetes and heart disease.

Economics of local and national food systems

It is important to understand the economic conditions that may contribute to food deserts—that is, the costs that food retail businesses face and the choices available to consumers who want to buy foods. Price is also a major determinant of food demand. The higher the price of a food, the lower the quantity demanded (Ploeg, 2009). On the other hand, the higher the price of a substitute food, the higher demand will be for that food item. Given the budget constraints of low-income consumers and the prices of some specific foods, low-income consumers may substitute higher priced goods with lower priced goods.

Travel costs and time costs of acquiring food as well as the time costs of preparing foods are also likely to affect demand for particular foods. Even for foods prepared at home, there may be relatively greater time costs than those for prepared foods or takeout foods. Consumers may value the convenience of a fast food or prepared meal more because it does not require spending much time to prepare. In general, supply is driven by the costs of input goods—in this case, the land, materials, machines, and labor needed to build and operate a grocery store and the costs of products to stock the shelves. As these costs increase, supply decreases (Ploeg, 2009). Differences in fixed or variable costs across areas could impact the types of stores and products available.

Food retailers that face higher fixed costs will either need to charge a higher price for goods sold or limit the range of products sold (Bitler and Haider, 2009). Fixed costs faced by food retailers probably vary greatly by the type of area. In dense urban areas, land prices may be higher and zoning requirements of local governments may be more cumbersome and costly to meet relative to less dense suburban and rural areas. stores that serve a higher volume of consumers (either in the number of consumers or in terms of the amount they purchase) will be able to spread fixed costs over more people and prices may be lower than in stores that serve lower volumes of consumers (Ploeg, 2009). This could explain why some rural, less populated areas do not have stores or why some foods may not be stocked in low-volume stores, especially foods that perish.

One major variable cost for operating a food store is the cost of hiring workers. Poor areas are often areas with relatively lower wages, which should reduce the costs to operate a store, all else equal (King, 2004). Stores serving low-income shoppers (stores with greater shares of revenue from SNAP participants) have significantly lower payroll costs as a percentage of sales than stores that do not serve as many low-income shoppers. (King, 2004) find that operating cost structures of stores with higher portions of total revenues from SNAP redemptions are different than those of other stores. For example, the stores had lower labor costs but also lower sales margins, and they were more likely to be supplied by wholesalers than to be part of a large chain with its own supply chain. However, overall operating costs for these stores were not different than other stores.

Supermarket "redlining"

Supermarket "redlining," which has been suggested as a possible reason some low-income or minority areas lack larger stores, could also constitute a market failure. Economic theory suggests that if markets are competitive, a retail firm that does not discriminate should have an incentive to locate in an area that is, except for its minority status, otherwise the same as any other area served by a supermarket. That is, the market would tend to reward firms that locate in otherwise underserved areas because there is less competition, at least in the short run. In the long run, nondiscrimination firms will enter the area until no more firms can be supported by the population. If firms lack good information on the true purchasing power or

demand for food in areas with concentrations of racial or ethnic minorities, then this market failure is one potential reason why firms do not locate in these areas.

Very broadly, grocery retail has gone through three major changes (innovations) in the past century: the rise of chain grocery stores over independently owned stores, the rise of supermarkets that offered an increased number and variety of products; and the rise of supercenters that continued the trend to even larger stores offering more and more products (Ellickson, 2005; Tedlow, 1990). Chain grocery stores used integration of manufacturing and wholesaling to cut out middlemen and offer lower prices (Ellickson, 2005).

The advent of computerized logistics and inventory systems integrated with the supermarkets themselves occurred during the 1980s and 1990s and provided the catalyst for the most recent trend toward supercenters. (Ellickson, 2005) shares evidence of this growth—in 1980, the average store carried 14,145 products; by 2004, the average store carried over 30,000 products. Reliance on their own distribution and inventory systems along with larger store sizes allowed supercenters to charge lower prices. Wal-Mart, which is now the Nation's largest retailer of grocery products, is one model of this type of format.

Economies of scale, economies of scope, and economies of agglomeration may also explain why product availability is differentially concentrated across areas or stores (Bitler and Haider, 2009). Economies of scale, which is when the costs of operating a store decrease as store size increases, and economies of scope, which is when the costs decrease as more product variety increases, suggests that larger stores that offer greater variety can do so and offer lower prices. Both factors may account for the ability of larger stores to survive more easily than smaller stores. In a competitive marketplace, firms selling the same products may have a disincentive to locate near each other (Ploeg 2009). But this may not always be the case. Economies of agglomeration, where the costs of operating a store are lower when a store is located near other stores (e.g., because of roads or distribution systems), may explain why stores are concentrated in some areas and not in others.

Food Desert zones Findings

Entrepreneurs in the dairy niche are the focus of this study. To focus on one, specific niche, the researchers are able to better gage the disconnections between producers, farmers

and distributors in relation to communication. Anecdotal evidence proves to be a powerful tool in the study of food networks, especially at a local level. This study shows the interaction between the locations of dairy production and cold storage aggregation centers relation to the surrounding food desert.

The Food Access / Zeemap integration (see Appendix 2.3) shows that there is a significantly higher number of Dairy Production Centers(10) around the Greensboro, Burlington, Hillsboro area (see Appendix B2.3.a) but a considerable amount less for cold storage aggregation(1) in the area. It can be shown that there is an entrepreneurial opportunity and need for cold storage aggregation to help support the local food industry and infrastructure. When looking at the 9 county area interaction (see Appendix B2.3.b) map an opposite occurrence is present in Winston Salem. The number of cold storage aggregation centers outnumbers the dairy production centers 5:1. This suggests that Cold storage centers are being underutilized in the Winston Salem area.

Interview findings

All interviews were analyzed based on their responses regarding what forms of marketing or online outreach they use and whether they foresee our project proposal as a helpful tool for entrepreneurial opportunities. Essentially, we wanted to evaluate how our project ideas may help small-scale, localized businesses in reaching a larger range of customers and other entrepreneurs. The interviews reinforced our team hypothesis; keeping in mind that communication will be improved beyond local relationships, and more specifically, using the Internet as an avenue of business. We firmly believe that entrepreneurial opportunities will increase by better connecting locals (producers and distributors) in the area.

The following sub-headings analyze few of the twenty interviews of local dairy entrepreneurs in Alamance and Guilford counties. They were selected based on how their responses fit in with the team's research questions asked in the project management plan. We

also selected them because they shared contrasting marketing techniques. Though they differ in size, purpose, and overall business models, they were selected because they help move our team forward in relation to our project goal. Online marketing techniques are emphasized in the analyses.

Reedy Fork Dairy Farm, Elon, NC

Reedy Fork Farm is a certified organic dairy farm located on 600 acres of farmland in Elon, NC. The farm is owned and operated by the George Teague family. The farm is a member of the Organic Valley Co-op and has been certified since 2007. George Teague asserts his farm has a rich heritage because they are a 6th generation farm; "Our work ethic and motives are embedded here." The farm is aware of online networking. They update a blog, are involved with Facebook, and use Local Harvest, which is a website that uses an interactive map as a farm directory. The farm also used YouTube to upload videos of day-to-day tasks completed on the farm. Teague acknowledged that a majority of their business happens right on the farm; however, they participant in local farmer's markets and sell to a local Co-op shop in Burlington, NC. They are always looking to reach out to the local community because they understand that they are the target market. "If we can connect on a smaller level, then business will more prosperous in the long run." Oftentimes farmers think that a wider market enables more profits because they are reaching a larger range of people. But that is not the case here; Teague finds that stronger connections are made at a local level. "An interactive map linking local dairy farms may boost business, even if it is a little bit."

Buttke Dairy Enterprises, Randleman, NC

Buttke Dairy Enterprises located in Randolph County, NC discourages the use of the

Internet for marketing purposes. They firmly believe in the power of personal connections and

'word-of-mouth' to stay connected for business. The respondent reinforced the phrase,

"Producers reach out to us, not visa versa." They currently do not have a website, Facebook

page and are not on the Local Harvest interactive map. The enterprise asserts that being a part

of an interactive map or site may help business, but are not too keen on the idea. Personal

contacts are their preferred means of business.

The Farm Fairy, Elon, NC

The Farm Fairy is located in Alamance County. They participate in the Elon ECC farmer's

market. The farm is a 1st generation farm and they specialize in making cheese. They get the

milk they use from local farm once a week where they also process their final cheese products.

To market their products they use Facebook and their personal website. They use E-commerce

to sell their products online. Oftentimes they advertise in a blog or newsletter if the

opportunity presents itself. The farm firmly believes in the power of the Internet,

acknowledging the technology-savvy generations. Although they know about Local Harvest,

they do not use it because they believe that it covers too wide a variety of produce. They feel

like their business would get "lost in the mix." The farmers suggest that the interactive map the

team produces should be more localized and focus on niche communities as opposed to the

whole food system network available in NC.

Cornucopia Cheese & Specialty Foods Co., Graham, NC

After 28-years, Cornucopia has grown into one of the leading cheese suppliers in the

southern U.S. providing over 1,000 products to customers in NC and the region. The respondent

attributes this claim to their loyal customers and acknowledges that their success hinges on the trust they have built with them over the years. They were established in 1980.

They heavily rely on their website to reach a wider range of customers, producers and distributors in the dairy business. The respondent explained that this is why their website is so interactive and aesthetically pleasing. Cornucopia makes it easy for viewers to contact them, view product lists and even blog about their experiences with their business. The respondent really liked our project proposal because they are always looking for ways to improve their connections via the Internet. The interactive map may make it easier for customers to see where the local farms are that Cornucopia uses and visa versa. This recurring theme of a win-win situation is successful for this corporation.

Rowland Row Family Farm, Gold Hill, NC

RR Farm turned out to be a huge success for our interview analyses. The farm started as a part of the Elma C. Lomax Incubator Farm in 2011 by Joe and Dani Rowland. In the interview, Dani talked extensively about their experiences learning about the business of farming. They participated in the farm incubator program initially intending to produce food for their own enjoyment. They did not expect to come out of the project thinking about opening a business for their local community. They now own and operate a small-scale farm where they produce dairy products and other all natural foods. Dani acknowledged that their farm does not make a large profit; however, she laughed saying, "Every little bit counts when living a rural lifestyle."

In 2012, RR Farm purchased GO Local NC Farms and relocated the operation to the Lomax Farm in Concord, NC. They fell in love with the site because there are no long-term commitments and no membership fees. Dani believes it is a win-win situation for them because

they are able to market their new farm for little to no cost. She also affirms that online

marketing will go a long way for them in the future, especially as newer generations get older.

She stated, "The Internet is the way newer generations can find out about anything they want,

even small farms such as their family farm." Finally, she concluded the interview saying that she

would love to add an interactive map and option for smartphone apps on their website.

Internet use

Evidence of producer interest in online tools is mounting. The rapid expansion of diverse

web offerings is taking advantage of this relatively new resource. There are three main Internet

sponsors used for agribusiness marketing: state-sponsored sites, private, for profit sites, and

nonprofit sites (Day 2005). Each category strongly suggest that producers are taking advantage

of the Internet and that affordable advertising and marketing opportunities are key positive

impacts for farmers (Berdegue *et. al.,* 2008).

The team compiled the interview findings into a table to better analyze the anecdotal

data (see Appendix C3). Four businesses claimed to have no Internet presence. This statement

simply means they currently do not use any form of Internet websites to market their dairy

products. Sixteen businesses are on the Internet. Ten businesses operate their own website and

six are available on other websites managed by other domains, more specifically, Local Harvest

and GO Local NC Farms. Finally, fifteen businesses administer a Facebook page, which is a great

indicator of the use of social media. All interviews concluded with questions along the lines of

"how do you currently connect/communicate with your local food distribution network? What

forms of the Internet or social media do you use (i.e. Facebook, local websites, etc.)? How can

we create a better market for your business using the Internet or social media?" These

questions serve as a great Segway to answer the question of how do we effectively community our findings to gain the interest of our stakeholders?

Towards the end of each interview, we explained the research goals of our project to gage their opinions on what topic we were studying. The majority of the businesses that were interviewed were pleased with our idea based on the premise that it served as a user-friendly approach to make information available about businesses in the Triad. The few that were not so keen on the proposal stated that their business heavily relies on the personal contacts made in the community. The team greatly appreciates the time and stories of these interviews. Without their stories, we could not have move forward to the extent that we did.

Evidence of agricultural entrepreneurship on the Internet

Statistical evidence on farmers' e-commerce participation is limited. In 2009, only 25-percent U.S. farms with Internet access used it for e-commerce (Mueller 2010). In northern Germany of that same year, in contrast, more than three quarters (~78-percent) of commercial farms that are online used the Internet for banking and financial transactions at the end of that fiscal year (Mueller 2010). However, only 28-percent of the farmers with Internet access make purchases online, and even fewer (20-percent) use the web for selling farm products (Mueller 2010).

While the benefits of e-commerce and awareness in other sectors of industry are well documented, researchers are just beginning to explore the value of the Internet as a business tool for agriculture producers. Some regional studies suggest that despite increasing rates of Internet use, agriculture producers generally find few benefits to using the Internet for business (Day 2005). A 2005 study of California farmers, for instance, claims that Internet purchases

generate small cost savings and Internet marking produces small increased returns (Smith & Paul 2005). While this study was conducted in the last decade, its qualitative data indicates about half of farmers who use the Internet for business recognizes that it enhances their competitiveness. In relation to current years, technology has become more pertinent to farm business as new applications and services are available (Day 2005; Mueller 2010).

It is important to note here that e-commerce is up-and-coming for agriculturists to market products. Our interview findings support this claim because each respondent acknowledged how prevalent the Internet is for business these days.

Expanding beyond the local food network

Beginner farming training and program development in the United States is one of the most significant areas of agriculture in recent years (Niewolny & Lillard 2010). It is poorly understood, however, since the literature is limited. Numerous case studies and program initiatives are scattered throughout the nation. The United States Department of Agriculture (USDA) lists about 143 farm incubator programs in the last decade (USDA 2013).

Supporting North Carolina's farmers is beneficial for the state's economy. Since 2010, the USDA estimates North Carolina's 9.5 million residents spend about $35 billion on food per year (USDA 2013). If each person committed to spend 10-percent of their current food budget on local produce, about $3.5 billion would be available in the local economy (CEFS 2013). This research will be further explained when we answer the question of how to communicate our team findings to our stakeholders.

Center for Environmental Farming Systems (CEFS): The 10% Campaign

The 10% Campaign is NC's first widespread food network campaign. Through its *Farm to Fork* initiative and action guide (available on CEFS website), CEFS has connected thousands of North Carolinians of local and regional organizations (CEFS 2013). Its communication system recognizes the value of human capital and the power of numbers when it comes to improving the local food structure in the state. The Campaign is spearheaded by the Center for Environmental Farming Systems (CEFS); they are committed to building North Carolina's sustainable local food economy (CEFS 2013). The goal of the 10% Campaign is to connect small-and-large-scale system of partnerships with local food producers and distributers and related businesses and communities. The 10% Campaign promotes entrepreneurship, educates consumers and collaborates with a wide range of stakeholders including organizations and initiatives in this field of work. CEFS has partnered with many institutions including Charlotte-based Compass Group and North Carolina Cooperative Extension Service (CEFS 2013). These organizations are working to develop the initial and long-term components of the campaign.

Online local food communities

We started our search on the Internet and found several online communities such as, Local Harvest and USDA 'Know your Farmer,' that used an interactive map tool for its users to locate different local businesses in their region (see Appendix D1.1). When interviewing the farmers, we found that they use information map tools for collecting information, but there was no way to communicate through these systems. They also noted that these maps were usually out-of-date. We found that local farm entrepreneurs were most likely communicating with other local business using e-mail or newsletters. In our interviews we also discovered that many of the farmers use Facebook to advertise. Finally, we looked at local communities who

use social and interactive media to communicate. We came across systems such as mobile

applications Local Pickins, Local Dish, and Keep it Local.

These mobile applications communication systems used an interactive food map to

locate local food and ways for their community to communicate amongst each other. We found

that all of these systems utilized mobile applications and had combinations of four main

features; User driven format, word of mouth advertising, and a local finder tool, and exclusive

deal opportunities. We found these applications were also using social media profiles for sign in

purposes, and a user could link his profiles up so Facebook get the updates associated with the

application. Social media is increasingly being used in many forms of online environmental

communities including websites like 350.org and in initiatives like "Hot Dish".

Keep it Local

Keep it Local utilizes a website (Keepitlocalok.com) and mobile application in their

online community communication system. Keep it local had all four of the key features we

found when assessing mobile applications. The Oklahoma based local food community offers its

local citizens the chance to be a part of their local food community through buying a

membership card that permits deals on all of the purchases at stores under the keep it local

network (see Appendix D1.1). These discounts range from 10% off your first purchase of flowers

at a flower shop, to a free drink at the local pub. Their communication system includes a

website as well as a mobile application, but while their communication system effectively

connects buyer to vendor it doesn't offer much information for upcoming local entrepreneurs.

The Keep it Local system does use an interactive map to locate its stores under its

networks, as well as a directory, that takes your GPS position and list the stores closest to you

(see Appendix D1.6). Its word of mouth system was very impressive giving you the capability to communicate with friends that were also a part of the Keep it Local application via text message or email through the application.

The word of mouth system is vital in creating an effective online community. From our interviews with farmers we learned about the intimate and tight-knit community is not always welcoming to outsiders. For this community to prevail it will be important to keep the integrity and exclusivity of its community. The next application didn't only used word of mouth, but it used the exchange of pictures between loved ones as well.

Local Pickins and Local Dish

Local Pickins had many similar features as Keep it Local but it had one very different form of communication in that it this mobile application takes advantage of delicious food picture sharing. The Food Pickin's application encourages it's users to take pictures of the local food and to upload the picture to a "wall" like feature in a similar format to the Facebook newsfeed wall (see Appendix D1.3). Local Pickins also has the ability to sign in through your Facebook and upload the pictures from your Food Pick Ins account directly to your Facebook account (see Appendix D1.4). This form of social media advertising is free for the local food vendors and a great way to get new customers into their stores.

Local dish and Local Pickins shared a similar event posting feature that made it possible for users to post relevant events are the local food community (see Appendix 1.5). This opens up opportunities for the community to post public invitations to events at a moment notice.

Implementing

To effectively implement a communication system such as this it would be best to do it through an already established network of locally minded people. Through our research quickly found that CEFS, and specifically the 10% Campaign are involved extensively throughout the state and with many partners such as NC cooperative extension, Carolina Farm Stewardship Association, North Carolina Farm Bureau Federation. Implementing this system through the CEFS' 10% campaign would mean instant participation through the app and mobile site in both customers and entrepreneurs.

Further Research for online food community project

Our study only interviewed farmers in the local community. Future research could consist of customer and strictly business owners to understand the specifics in what they are looking for in a comprehensive communication system. Further research in connecting farm incubator participants to the local food communication system would be helpful to see what kind of information new entrepreneurs would need to start their local business. The following sub-headings are topics we want the project to expand on in the future.

1) **Beginner farmers programs in the U.S.**

Beginner farmer programs are growing rapidly in the United States (USDA 2013). Development educators, researchers, students and farmers alike are experiencing the largest policy push in recent years. The response is overwhelming positive from an entrepreneurial standpoint. For instance, in fall 2009 the USDA awarded approximately $19 million through the Beginning Farmer and Rancher Development Program (BFRDP) (Niewolny & Lillard 2010). This first-time competitive grant program signifies an important movement to support local agricultural training, education and outreach (Niewolny & Lillard 2010; CEFS 2013). The grant

program aims to address the critical needs of beginning farmers across the United States and is built on a foundation of research from scholars, educators and decision-makers whose advocacy goals are to develop viable community food networks to meet the demands of future generations (Niewolny & Lillard 2010).

While agricultural training and education programs are available and made possible by the BFRDP, agricultural education research focusing on beginner farmers is limited. Most the reports discuss learning preferences based on age and location (Nelson & Trede 2004; Niewolny & Lillard 2010). With the exception of Shortall (1996), Liepins & Schick (1998) and Trauger *et al.* (2008), issues concerning social, political and cultural contexts are rare in the literature. For instance, little is known about the ways in which agriculture education serves as a bridge between agriculturists and food systems. The interviews from this case study asked questions about where the interviewee learned to farm and what his or her connection is within the food network. According to Niewolny & Lillard (2010), our interpretations and assumptions about what constitutes a connection between entrepreneurs and food networks must be the subject of in depth analysis and reflection if we want to alter the status quo towards a more communicative end.

2) **'Sustainable' plans for agriculture**

The concept of sustainability is a challenging one in agriculture. There are many definitions, none universally accepted. Appropriately, people are concerned with the need for agricultural practices to be economically viable, environmentally considerate and able to meet human demand of food in the long-term. An approach to improving local economies is to adopt sustainable innovation through community-based management, incentive programs and patron

evaluation and surveys (Gauthier & Wooldbridge, 2011; Gerstlberger, *et al*., 2013). Sustainable

innovation in agriculture requires a fundamental change in learning processes (Welsh 2011;

Reimer 2012). Learning must be facilitated through community leadership and specific

institutional frameworks and policy contexts (Rehr 2011; Welsh 2011) as previously mentioned.

It is difficult to pair agriculture with sustainability because production methods and measures

are costly and hard to integrate. Yet, the pair is fitting for the stresses of the time period. In an

era where environmental movements are prevalent for ecological, economic, political, cultural,

health purposes, sustainable plans for agriculture is simply one piece of the giant puzzle we find

in our world today.

Web of stakeholders

Community-based management, in various forms, is an established policy goal of rural

development (Gauthier 2011). The Alamance/Guilford 9-county region isimplementing a small-

scale agriculture partnership program to stimulate local community involvement in creating

sustainable alternatives for agriculture via a farm incubator. The project proposal entails

collaborative work to develop a comprehensive plan and report for local government officials,

farm incubator participants, businesses and all relevant stakeholders to foresee how integral

the project is for the future of local farming and industry. Since agricultural environmental

programs rely on voluntary participation by farmers and associated businesses it is critical to

identify where there are gaps in leadership, participation and funding (Zimmerman 2007;

Reimer 2012).

The web of stakeholders involved in a localized project includes people from the state,

regional and local levels. The list is extensive, but not limited to promoters of the outreach

campaign, the researchers, townships, entrepreneurs (farmers, restaurateurs, etc.), businesses, institutional consumers, marketers, producers, city government, and public health units (Stringer *et al.,* 2008). While Stringer *et al.,* (2008) talks about the concerns each stakeholder listed is interest, for instance, town ordinances for building codes, the scholars fail to elaborate on the possible solutions that accompany such concerns. Zimmerman (2007) and Reimer (2012) specifically talk about transferable solutions between locations through community-led of workshops. Bargainer, *et. al.* (2011) further enhances this topic by introducing a series of community-building steps in the assessment and planning of a local food system. The researchers chose steering communities to 1) define "community" and the community food system 2) define goals 3) talk about investments may impact the community food system 3) creating the baseline report and broadening the stakeholder base and, 4) create an action plan. While the report may be redundant for professionals in this line of work, it is important to revisit assessment plans and goals when collaborating with a wide range of stakeholders.

Food systems do not have to be complex. They can be as simple as a group of stakeholders gathering to discuss and list community food system assets and weaknesses (Bargainer, *et. al.* 2011). They can be more detailed studies that are conducted over a timeline, using surveys, interviews and other formal information-gathering instruments to compile specific data. For the purposes of this study, interviews of local Piedmont entrepreneurs guided our approach for theme of the project and the meta-analysis of various online campaigns and interactive maps enhanced the interviews' anecdotal data.

3) Farm incubator programs & training

Farm incubator programs train interested patrons in agriculture to encourage entrepreneurial opportunity in this field of work. Participants exchange time and produce for "rent" or space to work on a plot of land (CEFS 2013). With this exchange, the program encourages educators and business leaders to teach participants about specific niches. Programs often consist of workshops that touch upon several topics. For example, The PLANT Farm Enterprise Incubator located in Orange County, NC holds workshops specific to whole farm planning, plants, soils, irrigation, and equipment, planting, harvesting, and crop rotations, marketing opportunities and challenges, insects and diseases, and enterprise development, record keeping, taxes, and resources (PLANT 2013). The list is endless for different opportunities. The goal of the program is to teach aspiring farmers and entrepreneurs to learn from professionals in the industry so that they too can participate in self-disciplined agricultural opportunities.

Farm incubator – Alamance/Guilford counties

CEFS recently announced the launch of the new Incubator Farm Project. This project supports beginner farmers as they are an integral part of the 10% Campaign. The idea behind this Project is that "we can't have local food without local farmers. The long-term success of North Carolina's local food movement is dependent upon an influx of new and transitioning farmers" (CEFS 2013). The Project will work with communities to address the need by assisting them with repurposing public land into places that start-up new farming opportunities. These new farmers gain access to land, in exchange for farm products or other relevant services. The "win-win" is the backbone of this farm incubator opportunity. The main sponsor of this project is the Beginner Farmer and Rancher Development Program of the National Institute of Food

and Agriculture (CEFS 2013; USDA 2013). The National Center for Appropriate Technology holds the grant and CEFS is the Project's collaborator.

Braun *et al.,* (2008) talks about the two platforms of farmer field schools and local agricultural research committees promoting innovative thinking and decision-making for small-scale agriculture. The key processes require *the learning cycle* – observation, analysis and action (Braun *et al.,* 2008). These processes incorporate consultation of significant stakeholders, identification of participants and their needs, and the motivation component to energize target markets and communities. In the context of this study, the target community is the Alamance/Guilford communities and more specifically, small-scale agriculturists and dairy entrepreneurs. Diving even further into this scenario is the need to look at food deserts and aggregation areas in the 9 county regions. The proposed farm incubator site for this region is currently in deliberation; however, there is a need to specifically identify where the gaps are in this local food system. Where are the local food hubs? How close are dairy producers to their distributers? Where are the cold storage facilities in proximity to farmers and producers? How can we better link these partnerships and businesses together without compromising business models and strategies? These are several of the many questions surrounding the study's framework.

4) **"Mapping" the Alamance/Guilford counties**
      The researchers of this study are tasked with the proposal of a "user friendly" communication tool to effectively connect local food producers, distributers and consumers in the 9 county regions of Alamance and Guilford. The researchers are proposing a plan to tailor the small-scale agricultural dynamics of the Piedmont region. The theme of the communication

proposal is to localize North Carolina's most widespread form of industry, agricultural entrepreneurship. By using dairy entrepreneurs as the focus of this study, the team is able to hone in on small, niche community for the potential online community. The proposed system revolves around an "easy-to-use," open source mobile application and interactive map to utilize exclusive promotions and 'word-of-mouth' advertisements of the local food community. The team is working with the Piedmont Conservation Council to synthesize the goals of the 10% Campaign with the goals of the future Farm Incubator Project of Alamance/Guilford counties.

The team is collecting data to create dairy aggregation sites in the 9 county regions to gain basic knowledge of the local food industry. By pinpointing aggregation sites the researchers are better able to visually see where the dairy food deserts are in the area. With aid of an online interactive food systems map the data is clearly presented for users to identify producers, distributers, food hubs (i.e. farmers' markets) and cold storage facilities. This way users are welcome to view and click on points on the map to see where potential businesses are located; thereby, strengthening the connections between the local food system.

Final recommendations

The literature is extensive in view of the assessment and planning of a community-based food system, the importance of scale when analyzing agriculture, and how agricultural entrepreneurship is a challenging for outreach purposes. Applying the context of the team's research with the concepts found in the literature is difficult and informative because the information is tangible, yet sparse. More specifically, there is limited scholarly research on general information of farm incubator programs, interactive maps and media tools in relation to food networks. However, there is extensive information on beginner farmer programs,

entrepreneurial opportunities in small-scale agriculture and its need for improved marketing. Though the literature does not specifically hone in on the relationship between online marketing, the Internet and agricultural opportunity, it does, however, offer room for links to be made through certain statistics listed by the USDA and other noteworthy studies in recent years. This project is equivalent to a puzzle; the pieces are available, it is a matter of fitting them together.

Further research is necessary for the parameters of this project. More ethnographic research is needed to highlight the need for online marketing. More case studies are needed to support our ethnographic findings. It is crucial to have evidentiary support for the case studies, interactive map and online community proposal. The team hopes our recommendations are considered for the iMedia program and for Jen Walker's next project. The project's next stage encourages team members to broaden the scope of the project to include other small-scale agriculturists and entrepreneurs to see if there are other avenues to be explored. Realistically, data collections should be gathered over a longer period of time and interviews could be extended to ask more questions about personal endeavors and participation in the local food web and specific niche communities. We hope the project helps CEFS and PCC in their quest to obtain grant money for the Alamance/Guilford counties. The team is grateful for their experiences working with professionals in this line of work and research.

Final statements

This research project was conducted as preliminary research for designing a North Carolina local food online community. While NC's local food systems are developed, community outreach lacks support from a media-driven standpoint. The research from this study focused

on how the Alamance/Guilford counties can better connect small efforts of small initiatives using an interactive user page for NC farmers, producers, distributors and consumers. By identifying the needs for small, tight-knit niche communities and markets, the gathered information can be expressed through "user-friendly" online community. First and foremost, we i) identified how small-scale, beginner farmers and producers are established ii) how sustainability is integrated in this process and iii) what stakeholders are involved.

Our research group is currently searching for academic grants to design and build the website and mobile application through an interactive media master course, such as Elon University's I-media program. Interactive media students will be able to design the functionality of the website and mobile applications based on North Carolina's specific local food community. Interactive media students would also explore the use of social media as an advertising tool within the communication system, and as a form of currency within the community. Our research group is actively pursuing this endeavor.

The team affirms that creating a Piedmont online local food community will benefit local food producers and distributors as an information sharing and advertising tool. It also helps to introduce local food ideology to younger generations using interactive social media and mobile applications as a means of improving business relations via entrepreneurial opportunities.

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Appendix A   Project Management Plan

A1 Final Project Management Concept Map

The team's final project management uses three different research approaches to answer three pertinent questions. The Venn diagram was used to show how the project comes into full circle as each part of the project hinges off the other.

Appendix B   Interactive Map

B1 Dairy Production / Cold storage Aggregation Center Data

B1.1   Local 9-County Region Dairy Production Data

NAME	COUNTY	CITY	ADDRESS	PHONE	WEBSITE/EMAIL
Alamance Foods	Alamance	Burlington	739 Worth Street	(336) 226-6392	http://www.alamancefoods.com/
Stan's Quality Foods, Inc.	Alamance	Burlington	1503 N Graham Hopedale Rd	(336) 570-2572	http://www.manta.com/c/mmjftpv/stan-s-quality-foods
Steve's Garden Market	Alamance	Graham	329 W Harden St	(336) 226-4078	https://www.facebook.com/pages/Steves-Garden-Market/107295705993766
Agri-Science Opportunity, LLC	Durham	Durham	5914 Kemp Road	(919) 612-9092	http://www.agri-scienceopportunities.com/Home.html
Elodie Farms	Durham	Rougemont	9522 Hampton Rd.	(919) 479-4606	ordercheese@elodiefarms.com
La Casa Dei Formaggi	Durham	Durham	3409 Cromwell Rd.	(919) 403-8775	casadeiformaggi@southerncheese.com
Pura Vida Farms, LLC	Durham	Bahama	9109 Johnson Mill Rd.	(919) 270-8395	http://www.pvfarms.com/
Calico Farmstead Cheese LLC	Guilford	Gibsonville	3737 High Rock Rd.	(336) 449-7500	
Homeland Creamery	Guilford	Julian	6506 Bowman Dairy Rd	(336) 685-6455	http://www.homelandcreamery.com
Chapel Hill Creamery	Orange	Chapel Hill	615 Chapel Hill Creamery Road	(919) 967-3757	http://northcarolinafarmhousecheeses.com/
Hillsborough Cheese Co.	Orange	Hillsborough	3121 Rippy Lane	(919) 644-6358	hillsboroughcheese@southerncheese.com
Kilby Family Farms	Orange	Hillsborough	3121 Rippy Lane	(336) 301-1661	http://lomomarket.com/producers/kilby-family-farms/
Maple View Farm	Orange	Hillsborough	3109 Dairyland Road	(919) 933-3600	http://www.mapleviewfarm.com/
Prodigal Farm	Orange	Rougemont	4720 Bahama Rd	(919) 477-5653	http://prodigalfarm.com/
Goat Lady Dairy	Randolph	Climax	3515 Jess Hackett Road	(336) 824-2163	info@goatladydairy.com
NCSU Dairy Plant	Wake	Raleigh	Campus Box 7624, NCSU	(919) 513-2488	
North Carolina State University	Wake	Raleigh	Food Science Bldg	(919) 515-2760	
the Cultured Cow Creamery	Durham	South Durham	5914 Kemp Road Durham	919-744-7919	dexter@cultured-cow.com
Dodge Lodge Farm		Greensboro	505 N. Greene St., Greensboro	(336) 210-1947	http://www.localharvest.org/dodge-lodge-farm-organic-locally-grown-M12077
Colony Processing Inc	Monroe	Monroe	2626 Executive Point Dr	(704) 226-9666	colonygums.com
Buffalo Creek Farm and	Forsyth	Germanton	3255 Buffalo	(336) 969-	http://buffalocreekfarmandcr

NAME	COUNTY	CITY	ADDRESS	PHONE	WEBSITE
Creamery, LLC			Creek Farm Rd	5698	eamery.com/
W.G. White Country Store and Wholesale	Davie	Mocksville	2119 Hwy. 601 North	(336) 492-2111	http://wgwhite.com/
Our Pride Foods of Roxboro, Inc	Person	Roxboro	1128 N Main St	(336) 597-4978	http://www.manta.com/c/mmnbml6/our-pride-foods-of-roxboro-inc
Sleepy Goat Farm	Caswell	Pelham	7215 Allison Road	(336) 388-0703	slpygoat@gamewood.net http://www.sleepygoatfarm.com/
Dancing Doe Dairy	Chatham	Pittsboro	784 Jay Shambley Road	(919) 663-3981	http://www.manta.com/c/mr4xzkq/doe-dancing-dairy
Paradox Farm	Moore	West End	449 Hickory Creek Ln	(910) 723-0802	http://paradoxfarmcreamery.com/cheeses.html
Sweet Frog Fayetteville	Cumberland	Fayetteville	4191 Sycamore Dairy Rd	(910) 867-2207	http://sweetfrogyogurt.com/
The Inn at Celebrity Dairy	Chatham	Siler City	144 Celebrity Dairy Way, Siler City, NC	(919) 742-5176	http://www.celebritydairy.com/

B1.2 State-wide data - Cold storage Aggregation Center

NAME	COUNTY	CITY	ADDRESS	PHONE
US Cold Storage Inc	Beaufort	Bath	1339 Bayview Rd	(252) 923-1412
Carolina Cold Storage Limited Partnership	Bladen	Tar Heel	16271 Highway 87 N	(910) 862-7494
SCI Cool Inc	Buncombe	Asheville	109 Elk Park Dr	(828) 626-3000
Americold	Cabarrus	Kannapolis	1211 Pump Station Rd	(704) 932-6119
James Douglas Williams	Duplin	Magnolia	410 James St	(910) 289-3370
United States Cold Storage, Inc	Duplin	Warsaw	240 Bruce Costin Rd	(910) 293-7400
Americold Logistics, LLC	Edgecombe	Tarboro	200 Sara Lee Rd	(252) 641-1191
Jacobson Company	Forsyth	Rural Hall	200 Forum Pkwy	(336) 969-2628
Richmond Cold Storage Company, Incorporated	Forsyth	Rural Hall	275 Northstar Dr	(336) 969-4444
Shugart Management Inc	Forsyth	Winston Salem	5644 Shattalon Dr	(336) 765-3516
B & M Storage and Distribution, Inc.	Forsyth	Winston Salem	690 Gaynor St	(336) 767-4900
Promesa Distributors, Inc	Forsyth	Winston-Salem	5160-A Indiana Ave	(336) 767-1943
Ice Service Inc	Guilford	Greensboro	6119 Landmark Center Blvd	(336) 852-1515
Millard Refrigerated Services, Inc.	Iredell	Statesville	3776 Taylorsville Hwy	(704) 838-1117

Engineered Refrigeration Systems, Inc.	Jackson	Sylva	1000 US Highway 441 S	(828) 586-1063
Nordic Logistics and Warehousing, LLC	Johnston	Benson	2458 Hodges Chapel Rd	(919) 894-5191
Cloverleaf Cold Storage Co.	Johnston	Benson	444 Gilbert Rd	(919) 207-4420
Craig Trucking	Lee	Sanford	2800 Craig Dr	(919) 776-7632
Cloverleaf Cold Storage Co.	Lee	Sanford	111 Imperial Dr	(919) 775-4474
Bost Distributing Co.	Lee	Sanford	2209 Boone Trail Rd	(919) 775-5931
Americold Logistics, LLC	Mecklenburg	Charlotte	12520 General Dr	(888) 484-4877
Integrated Global Solutions, LLC	Mecklenburg	Huntersville	14108 Holly Springs Dr	(612) 991-1255
Southern Refrigerated Logistics LLC	Mecklenburg	Charlotte	5119d Hovis Rd	(704) 806-8040
Nordic Cold Storage, LLC	Mecklenburg	Charlotte	5610 David Cox Rd	(704) 598-0777
Carolina Warehousing & Transportation Group, Inc.	Mecklenburg	Charlotte	5806 Prspty Chrch A-2 Ste A 2	(704) 398-1188
Bonded Logistics, Inc.	Mecklenburg	Charlotte	7320 Statesville Rd	(704) 597-9638
Christie's Cold Storage Inc	Mecklenburg	Charlotte	920 Black Satchel Rd A	(704) 398-9222
Spring Acres Sales Company	Nash	Spring Hope	1280 Macedonia Rd	(800) 849-5436
Nash Produce Inc.	Nash	Nashville	3500 Sandy Cross Rd	(252) 443-6011
Battleboro Produce	Nash	Battleboro	5292 Battleboro Leggett Rd	(252) 446-3636
Farm Pak	Nash	Spring Hope	7840 Old Bailey Highway	(800) 367-2799
Carter's Distributing	New Hanover	Wilmington	1101 Kenningston St	(910) 395-1489
Julie's Mini Storage, LLC	Onslow	Swansboro	114 John L Hurst Dr	(910) 330-4844
Fulchers Point Pride II	Pamlico	Alliance	114 Gatlin Rd	(252) 745-7711
Fulcher's Point Pride Seafood	Pamlico	Oriental	101 South Ave	(252) 249-0123
James Bros Inc	Pasquotank	Elizabeth City	1375 Salem Church Rd	(252) 330-5561
Farm Fresh Transportation, LLC	Polk	Tryon	520 Pinefield Dr.	(828) 863-1231
Nordic Cold Storage, LLC	Robeson	Lumberton	275 Cold Storage Rd	(910) 738-1131
United States Cold Storage, Inc	Robeson	Lumberton	2901 Kenny Biggs Rd	(910) 739-1992
L&M Warehouse & Packing, Inc.	Rowan	Salisbury	218 Julian Rd	(704) 637-7303
United States Cold Storage, Inc	Union	Marshville	114 Cuddy Dr	(704) 624-3555

Hessler, LLC	Vance	Henderson	860 Commerce Dr	(252) 492-5067
Ford's Foods Inc	Wake	Raleigh	1109 Agriculture St	(919) 833-7559
L&M Warehouse & Packing, Inc.	Wake	Raleigh	2925 Huntleigh Dr Ste 204	(919) 981-8000
Nordic Cold Storage, LLC	Wake	Raleigh	915 Withers Rd	(919) 772-5182
Nordic Cold Storage Limited Partnership	Wayne	Goldsboro	403 Commerce CT	(919) 751-5232

B1.3   State-wide data - Dairy Production

Alamance Foods	Alamance	Burlington	739 Worth Street	(336) 226-6392
Stan's Quality Foods, Inc.	Alamance	Burlington	1503 N Graham Hopedale Rd	(336) 570-2572
Steve's Garden Market	Alamance	Graham	329 W Harden St	(336) 226-4078
Greene Meadows Creamery	Alleghany	Laurel Springs	10754 Hwy 18N	(336) 657-0422
Ashe County Cheese	Ashe	West Jefferson	P. O. Box 447	(336) 246-2501
Heritage Homestead	Ashe	Crumpler	960 Roy Goodman Road	(336) 982-4753
Blue Ridge Mountain Creamery	Buncombe	Fairview	327 Flat Creed Road	(828) 628-5808
Land-O-Sun Dairies L.L.C.	Buncombe	Arden	10 Trident Dr	(828) 681-0900
Looking Glass Creamery LLC	Buncombe	Fairview	57 Noble Road	(828) 458-0088
Milkco, Inc.	Buncombe	Asheville	220 Deaverview Rd	(828) 254-9560
Round Mountain Creamery	Buncombe	Black Mountain	2203 Old Fort Rd.	(828) 713-4887
Southern Caviar, LLC	Buncombe	Arden	5 Glenn Bridge Road	(828) 775-9800
Cackleberry	Cabarrus	Concord	7300 Untz Rd.	(704) 788-1059
La Costena Food, Inc.	Cabarrus	Concord	610 Warren C. Coleman Bvd	(704) 792-9162
La Reina/ El Mercado	Cabarrus	Kannapolis	1316-F South Main Street	(704) 201-5941
Ashe County Cheese	Caldwell	West Jefferson	106 East Main St	(336) 246-3501
Ripshin Goat Dairy	Caldwell	Lenoir	1865 Hwy 268	(828) 758-0906
Sleepy Goat Farm	Caswell	Pelham	7215 Allison Road	(336) 388-0703
Celebrity Dairy	Chatham	Siler City	198 Celebrity Dairy Way	(919) 742-5176
Dancing Doe Dairy	Chatham	Pittsboro	784 Jay Shambley Road	(919) 663-3981
High Mountain Meadows	Clay	Hayesville	486 Double Knobs Dr.	(828) 389-1186
Dallas Ranch	Cleveland	Lawndale	132 Dallas Road	(704) 538-3397
Guernsey Girl Creamery	Cleveland	Shelby	3370 Bridges Dairy	(704) 692-8230

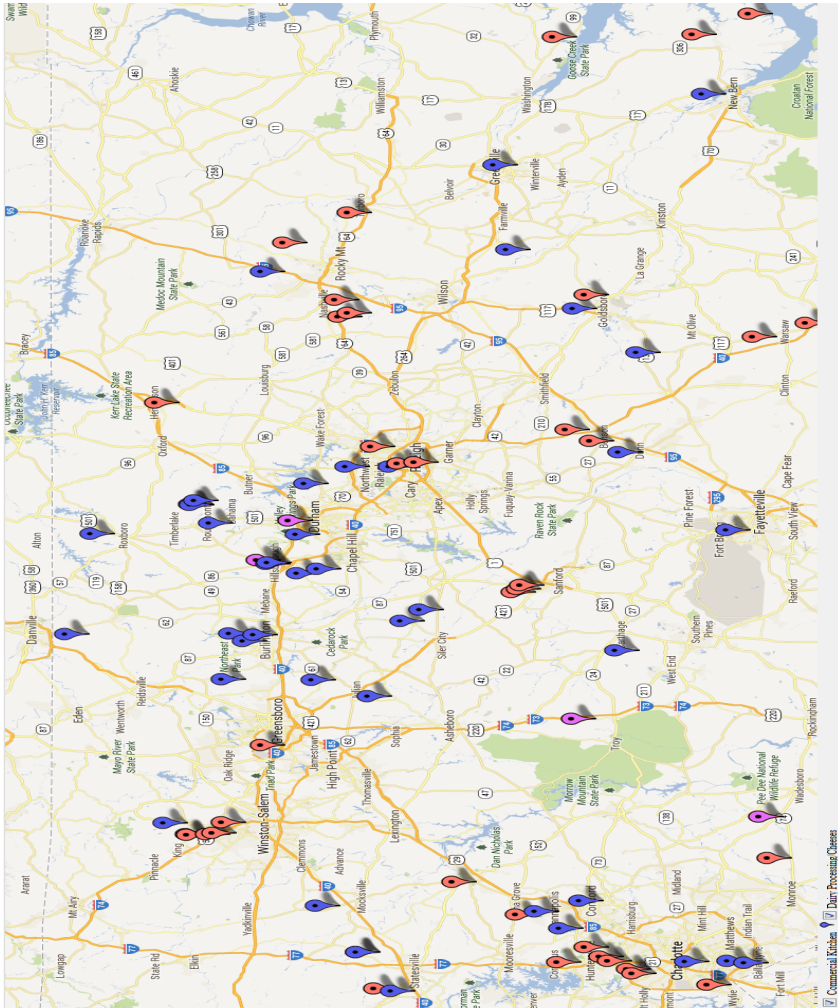|			Road	
Guernsey Girl Creamey	Cleveland	Shelby	3370 Bridges Dairy Road	(704) 692-8230
Mack's Liver Mush	Cleveland	Shelby	6126 Mckee Road	(704) 434-6188
Mariah Farms	Cleveland	Casar	400 Mariah School Road	
Maola Milk and Ice Cream Company, LLC	Craven	New Bern	305 Avenue C	(252) 638-1131
Sweet Frog Fayetteville	Cumberland	Fayetteville	4191 Sycamore Dairy Rd	(910) 867-2207
W.G. White Country Store and Wholesale	Davie	Mocksville	2119 Hwy. 601 North	(336) 492-2111
Agri-Science Opportunity, LLC	Durham	Durham	5914 Kemp Road	(919) 612-9092
Elodie Farms	Durham	Rougemont	9522 Hampton Rd.	(919) 479-4606
La Casa Dei Formaggi	Durham	Durham	3409 Cromwell Rd.	(919) 403-8775
Prodigal Farm	Durham	Rougemont	4900 Bahama Rd	(919) 477-5653
Pura Vida Farms, LLC	Durham	Bahama	9109 Johnson Mill Rd.	(919) 270-8395
Poppies International I, Inc.	Edgecombe	Battleboro	6610 Corporation Pkwy	(252) 442-4016
Buffalo Creek Farm and Creamery, LLC	Forsyth	Germanton	3255 Buffalo Creek Farm Rd	(336) 969-5698
Howe's Dairy	Gaston	Gastonia	3502 Howe Dairy Rd	(704) 864-6207
Yellow Branch Farm, Inc.	Graham	Robbinsville	136 Yellow Branch Circle	(828) 479-6710
Jones Fruit Farm	Greene	Walstonburg	6974 Beaman Old Creek Road	(252) 747-3989
Calico Farmstead Cheese LLC	Guilford	Gibsonville	3737 High Rock Rd.	(336) 449-7500
Homeland Creamery	Guilford	Julian	6506 Bowman Dairy Rd	(336) 685-6455
Maola Milk and Ice Cream Company, LLC	Harnett	Dunn	1100 S Clinton Ave	(910) 892-7603
Vineyard's Edge	Henderson	Hendersonville	278 Worlds Edge Road	(828) 685-1422
Holton Hollow Farm	Iredell	Statesville	154 Matthew Drive	(704) 873-0644
Origin Food Group, LLC	Iredell	Statesville	306 Stamey Farm Rd	(704) 768-9000
The Great Milky Way Dairy	Iredell	Statesville	154 Matthews Drive	(336) 813-9612
Dark Cove Farm	Jackson	Cullowhee	300 Plowshare Dr. Pob 944	(828) 293-3781
Cheval Farmstead Dairy	Lincoln	Vale	2380 Cats Square Rd.	(704) 240-9353
Pete's Cheese	Madison	Marshall	258 Carolina Lane	(239) 940-0901
Spinning Spider Creamery	Madison	Marshall	4717 East Fork Road	(828) 689-5508
Three Graces Dairy LLC	Madison	Marshall	335 Milky Way	(828) 656-2195

Susan English Dairy	McDowell	Marion	19618 Us Highway 221 N	(828) 756-4625
Dean Foods Company	Mecklenburg	Charlotte	3436 Toringdon Way # 200	(704) 341-2794
Outdoor Herbivore LLC	Mecklenburg	Charlotte	314 Manning Dr	(828) 423-0787
Yogur Moonberries Frozen	Mecklenburg	Charlotte	16041 Johnston Rd	(704) 541-0918
Oakmoon Creamery	Mitchell	Bakersfield	57-B North Hwy 226	(828) 688-4683
Paradox Farm	Moore	West End	449 Hickory Creek Ln	(910) 723-0802
Chapel Hill Creamery	Orange	Chapel Hill	615 Chapel Hill Creamery Road	(919) 967-3757
Hillsborough Cheese Co.	Orange	Hillsborough	3121 Rippy Lane	(919) 644-6358
Kilby Family Farms	Orange	Hillsborough	3121 Rippy Lane	(336) 301-1661
Maple View Farm	Orange	Hillsborough	3109 Dairyland Road	(919) 933-3600
Prodigal Farm	Orange	Rougemont	4720 Bahama Rd	(919) 477-5653
Nature's Way Farm & Seafood	Pender	Hampstead	115 Crystal Court	(910) 270-3036
Our Pride Foods of Roxboro, Inc	Person	Roxboro	1128 N Main St	(336) 597-4978
Maola Milk and Ice Cream Company, LLC	Pitt	Greenville	107 Hungate Dr	(252) 756-3160
Sunrise Farm	Polk	Columbus	280 Landrum	(828) 899-0592
Goat Lady Dairy	Randolph	Climax	3515 Jess Hackett Road	(336) 824-2163
Black River Farmstead	Sampson	Ivanhoe	10390 NC 210 Hwy East	(910) 669-3340
Two Rivers Farmstead	Sampson	Ivanhoe	10390 NC 210 Hwy East	(910) 669-3340
Pyrwood Dairy LTD	Transylvania	Pisgah Forest	20 Everett Road	(828) 489-1304
Bosky Acres Inc	Union	Waxhaw	8517 Bent Creek Road	(704) 843-5947
NCSU Dairy Plant	Wake	Raleigh	Campus Box 7624, NCSU	(919) 513-2488
North Carolina State University	Wake	Raleigh	Food Science Bldg	(919) 515-2760
Holly Grove Farm	Wayne	Mount Olive	1183 Grantham School Road	(919) 689-2031
Land-O-Sun Dairies L.L.C.	Wayne	Goldsboro	1105 N William St	(919) 734-0574
Stone Mountain Valley Cheese, Inc.	Wilkes	Traphill	1095 Traphill-Brown Rd.	(336) 957-8525

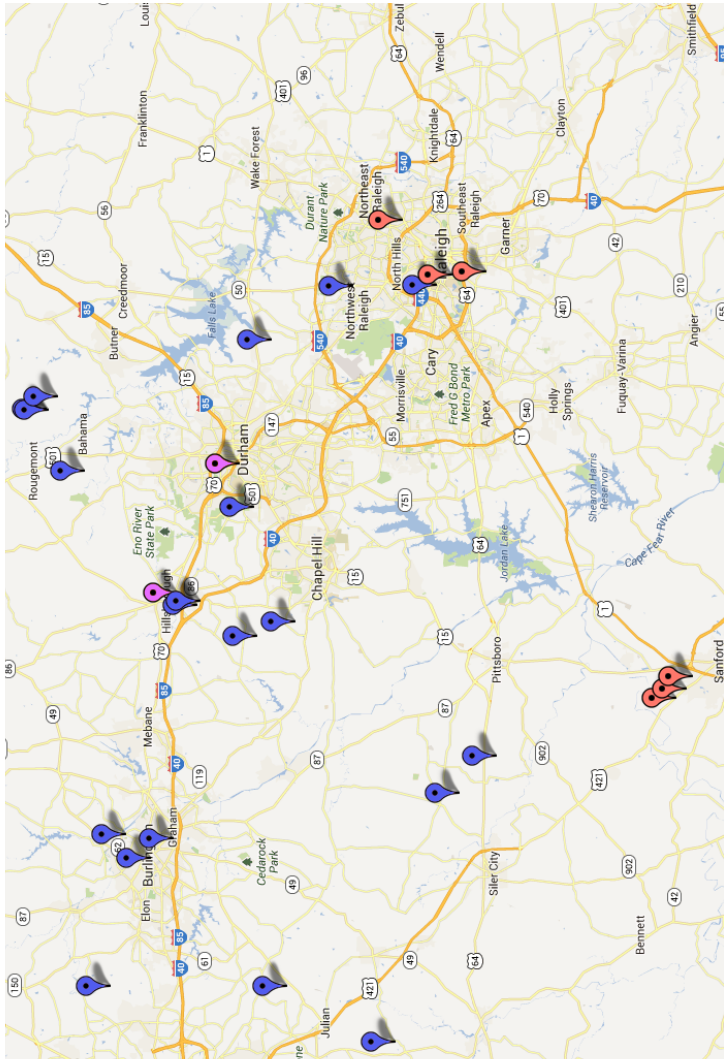**B2** Maps

B2.1   Zee maps
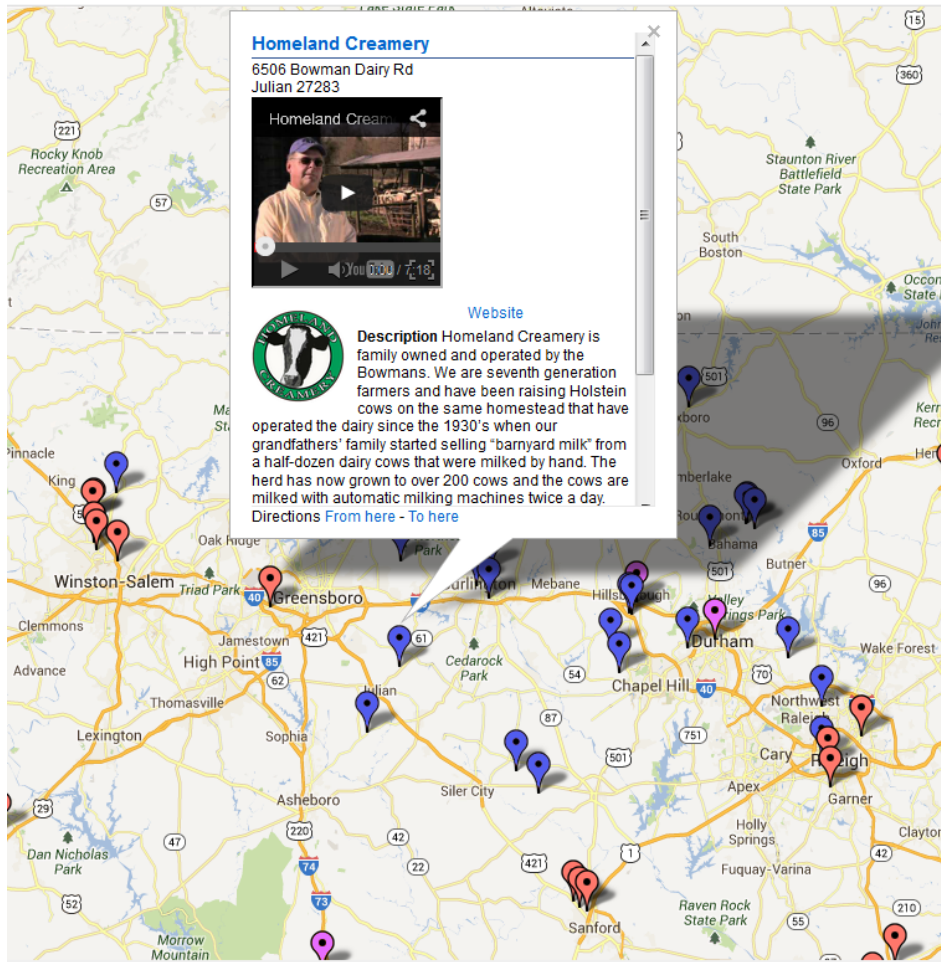
B2.1.a   State-wide

B2.1.b   Local 9-county Area

B2.1.c   Interactive Map Example

B2.2   Food Desert Zone Maps

B2.2.a   Introduction to the Food Access Research Atlas

The Food Access Research Atlas: http://www.ers.usda.gov/data-products/food-access-research-atlas/go-to-the-atlas.aspx

- Presents a spatial overview of food access indicators for low-income and other census tracts using different measures of supermarket accessibility;
- Provides food access data for populations within census tracts; and
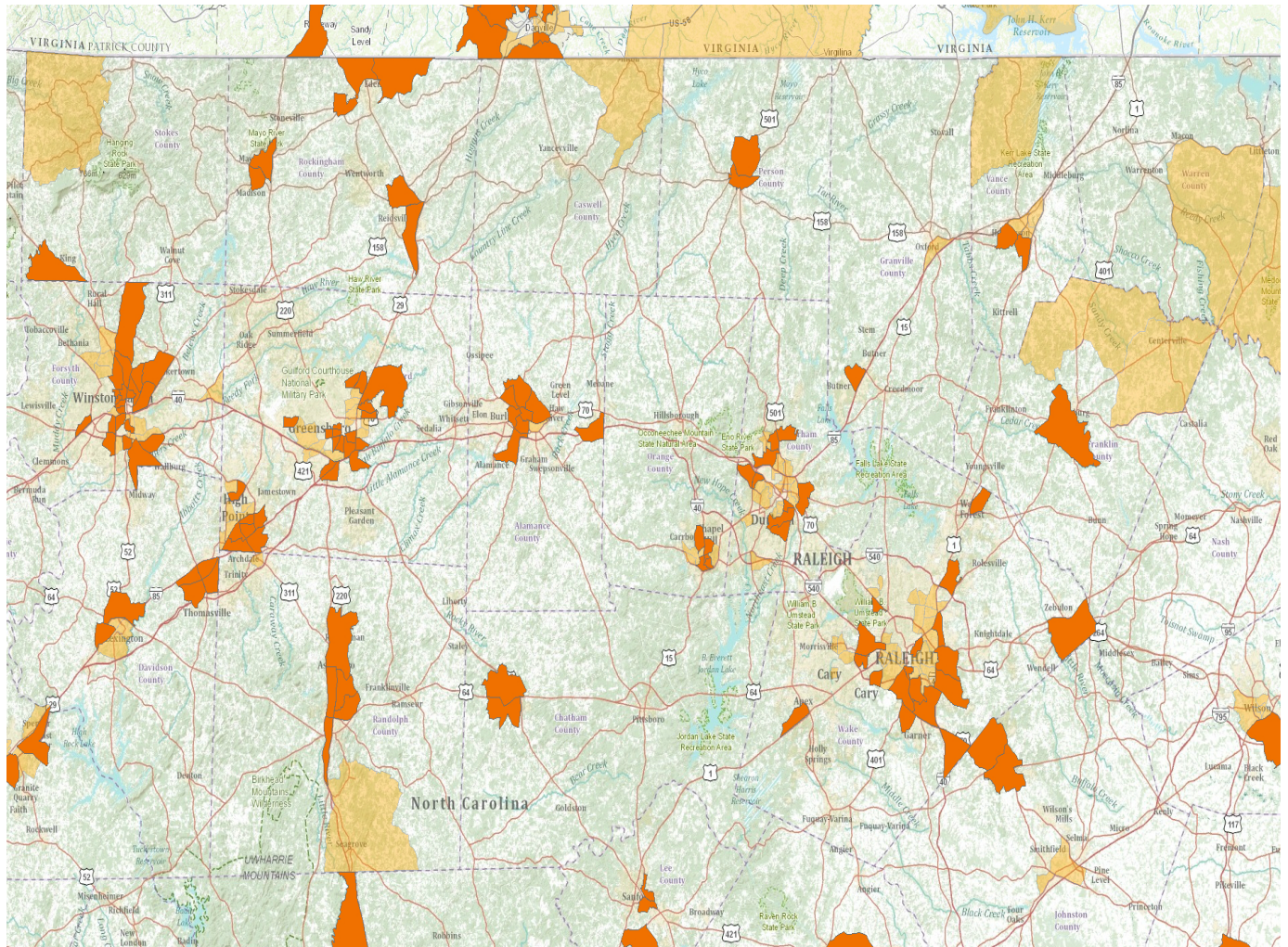- Offers census-tract-level data on food access that can be downloaded for community planning or research purposes.

Green = Low income census tracks where a significant number or share of residents is more than 1 mile urban, or 10 miles rural from the nearest super market
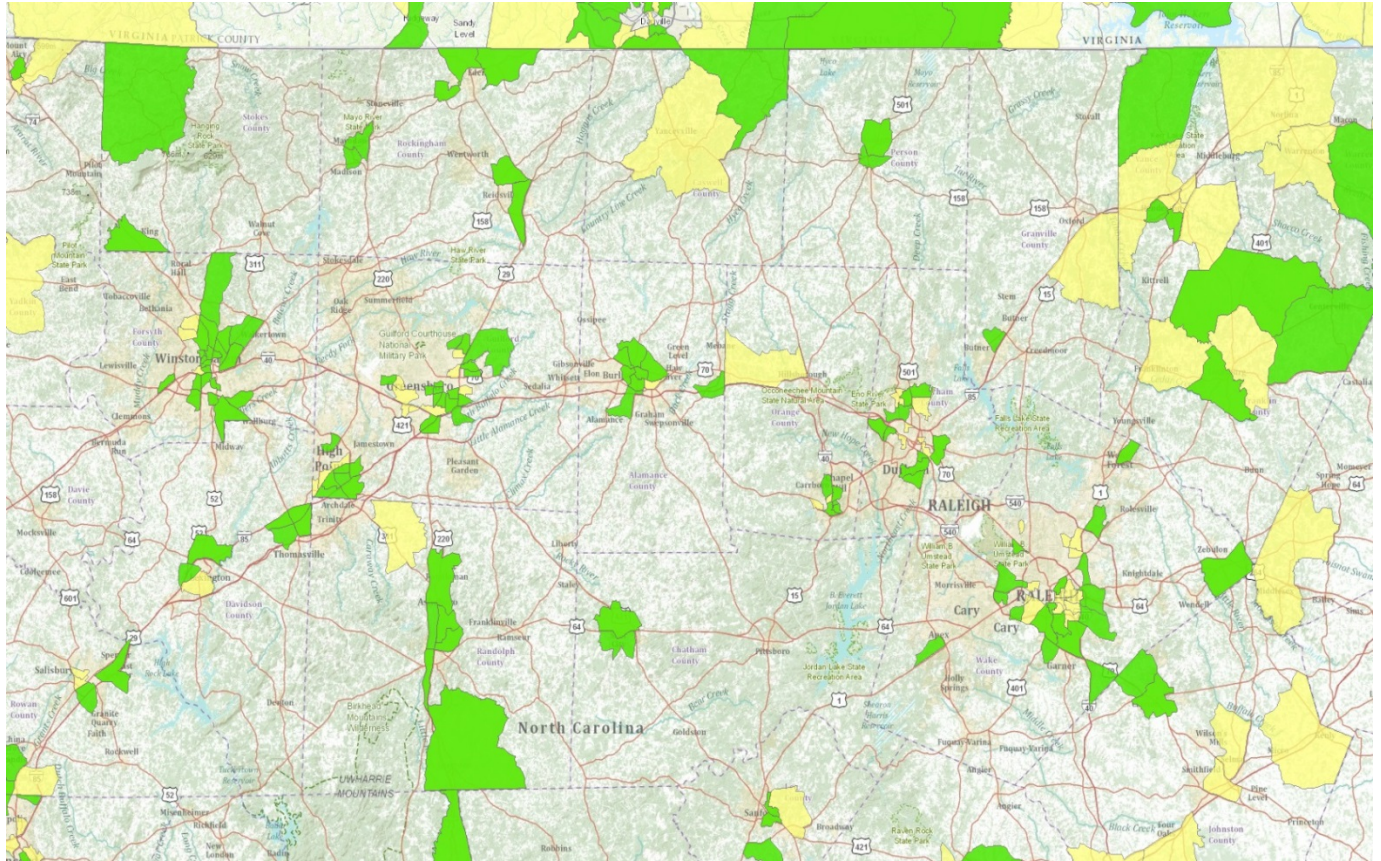
Orange = Low income census tracks where a significant number or share of residents is more than 0.5 mile urban, or 10 miles rural from the nearest super market

RED = Low income census tracks where a significant number or share of residents is more than 1 mile urban, or 20 miles rural from the nearest super market.

Yellow = Low income census tracks where a significant number of households have low vehicle access or a significant number or share of residents are more than 20 miles away from super market access

Purple = tracts in which more than 100 households have no access to a vehicle and are more than a 0.5 mile away from the nearest super market

A blending of colors shows an interaction between the variables

B2.2.b   Food Desert Zone Maps Piedmont Region Red vs. Orange

= Low income census tracks where a significant number or share of residents is more than 0.5 mile urban, or 10 miles rural from the nearest super market

= Low income census tracks where a significant number or share of residents is more than 1 mile urban, or 20 miles rural from the nearest super market.

This map shows the difference between different census track layers in the 9 county areas around Elon University. These could be potential areas to focus on trying to set up community based agriculture systems to set in place for areas that need fresh produce.
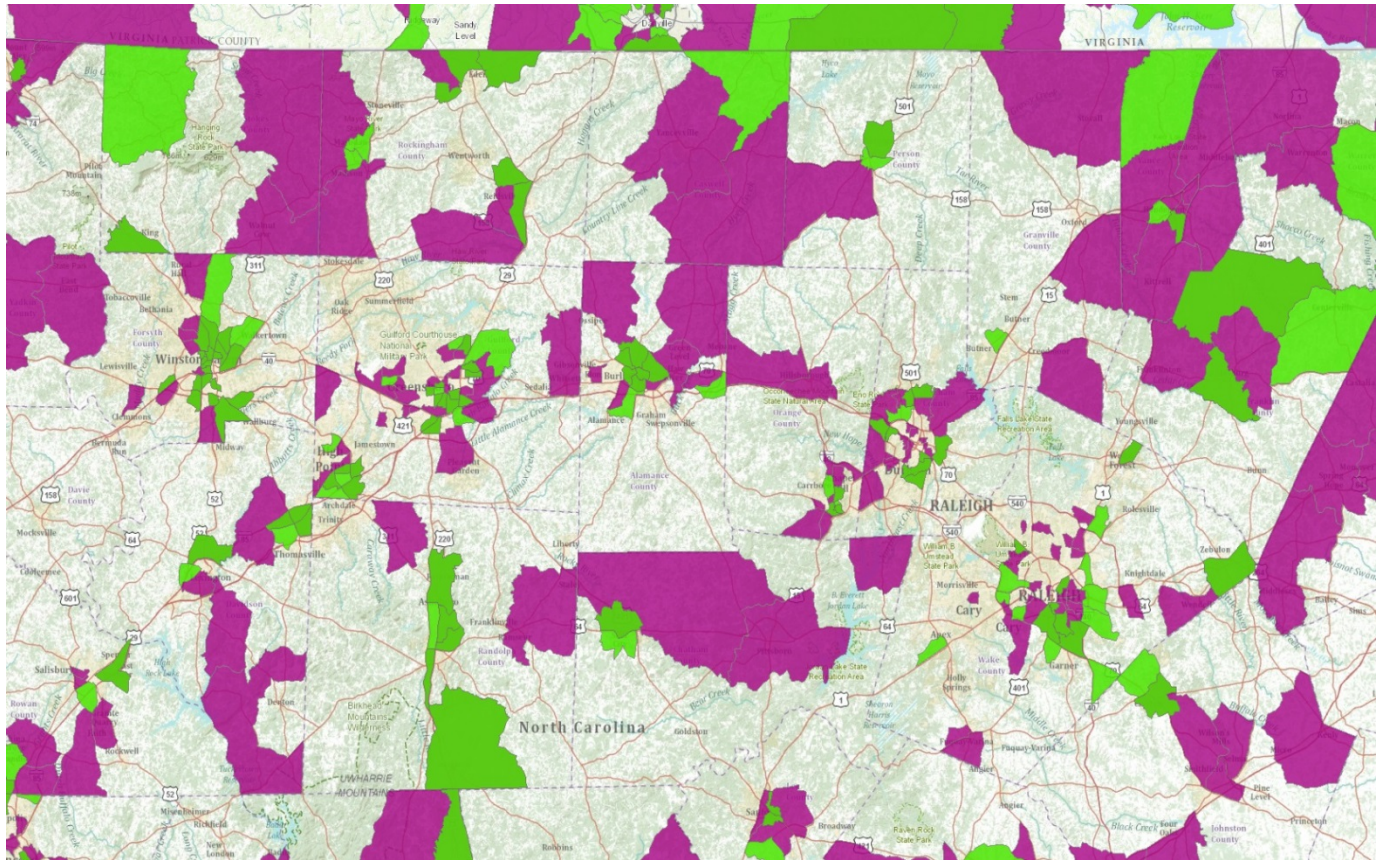
B2.2.c   Food Desert Zone Maps Piedmont Region Yellow vs. Green

Green = Low income census tracks where a significant number or share of residents is more than 1 mile urban, or 10 miles rural from the nearest super market

Yellow = Low income census tracks where a significant number of households have low vehicle access or a significant number or share of residents are more than 20 miles away from super market access.
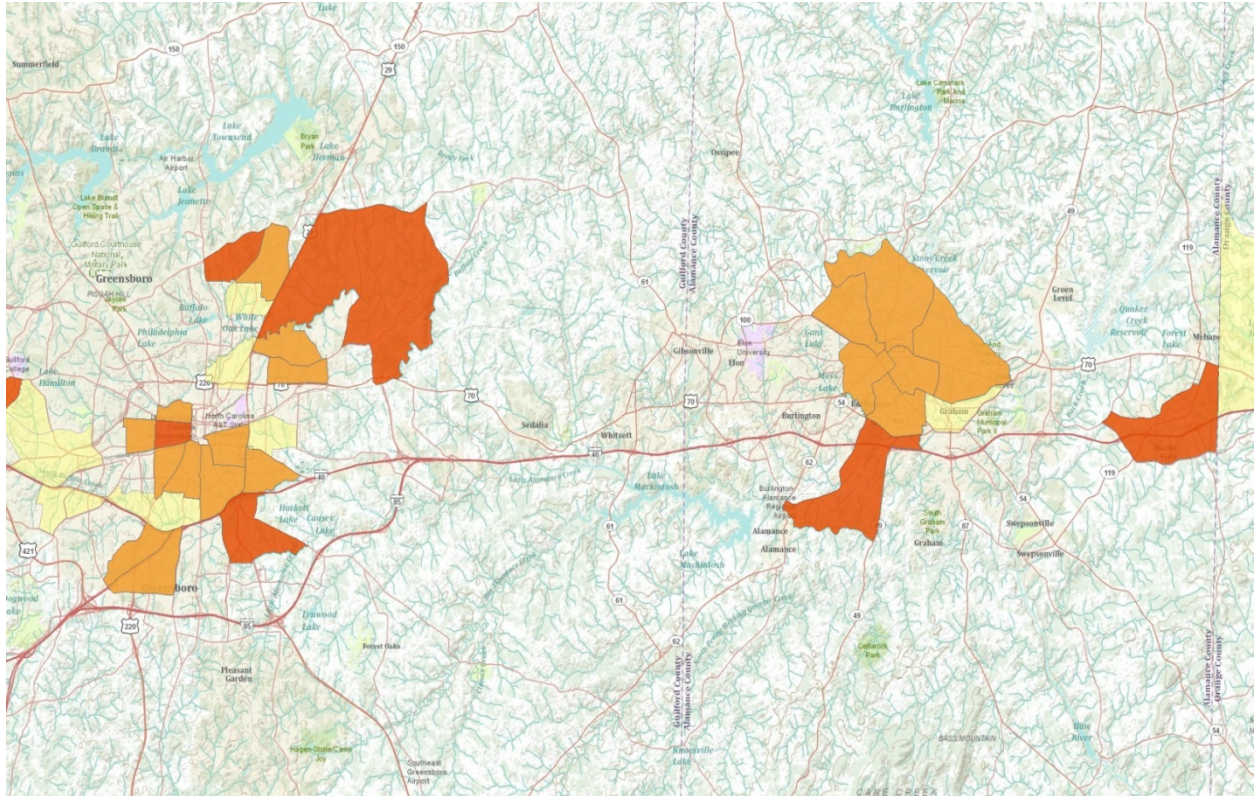
B2.2.d Food Desert Zone Maps Piedmont Region Purple vs. Green

Purple = tracts in which more than 100 households have no access to a vehicle and are more than a 0.5 mile away from the nearest super market.

Green = Low income census tracks where a significant number or share of residents is more than 1 mile urban, or 10 miles rural from the nearest super market

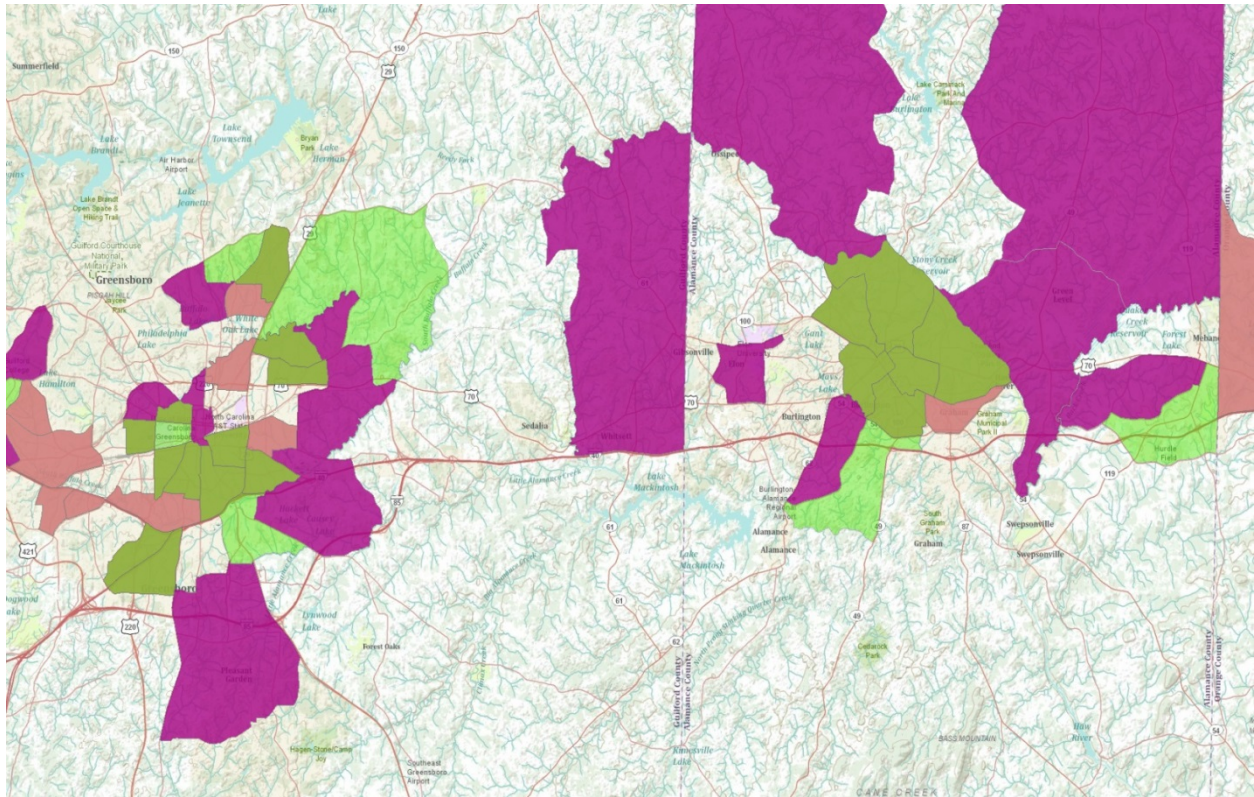**B2.2.e** Food Desert Zone Greensboro, Elon, Burlington NC Red vs. Yellow

RED = Low income census tracks where a significant number or share of residents is more than 1 mile urban, or 20 miles rural from the nearest super market.

Yellow = Low income census tracks where a significant number of households have low vehicle access or a significant number or share of residents are more than 20 miles away from super market access

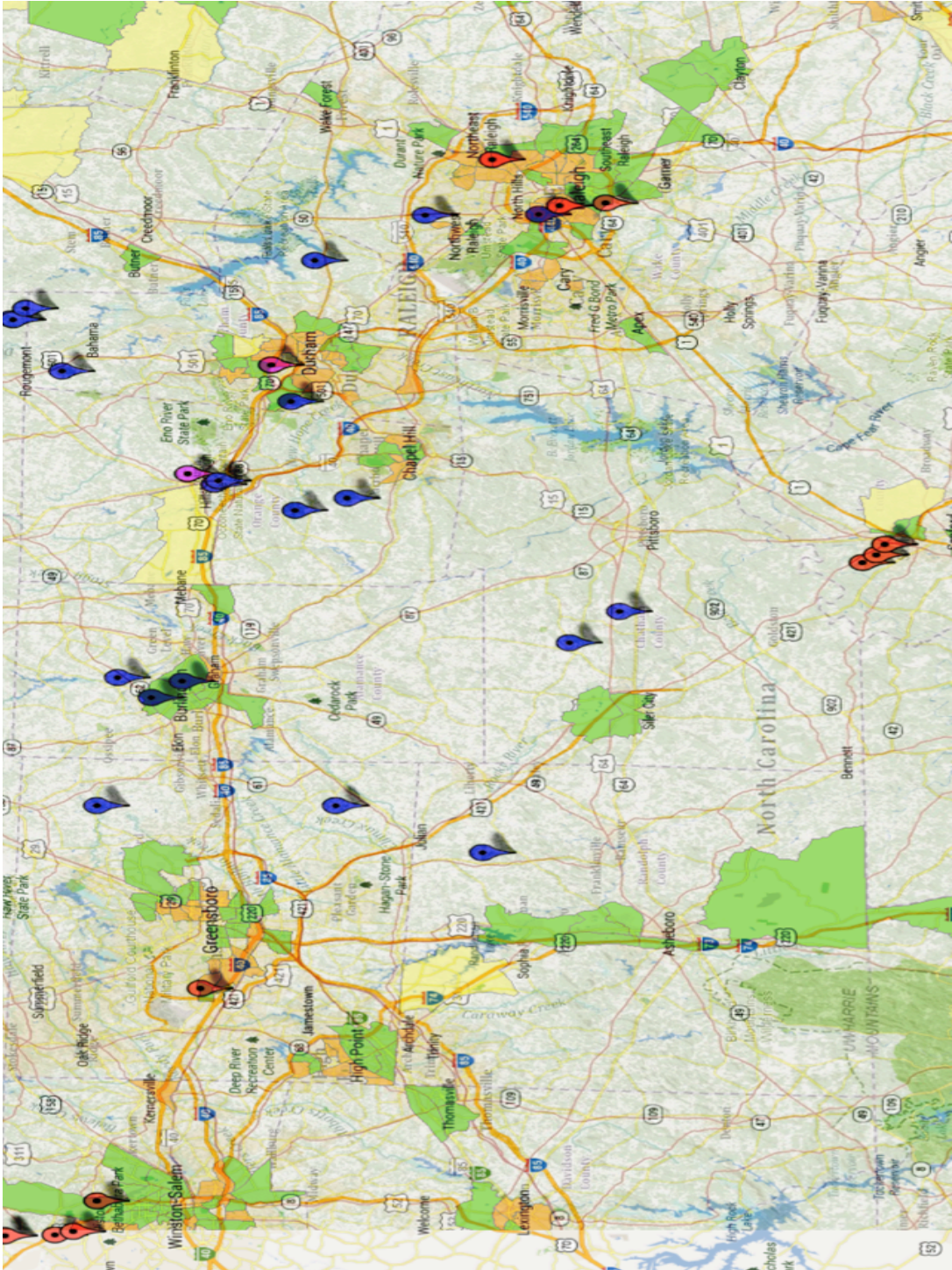**B2.2.f**   Food Desert Zone Greensboro, Elon, Burlington NC Purple vs. Green vs.

Yellow

Purple= tracts in which more than 100 households have no access to a vehicle and are more than a 0.5 mile away from the nearest super market.

Green = Low income census tracks where a significant number or share of residents is more than 1 mile urban, or 10 miles rural from the nearest super market

Yellow = Low income census tracks where a significant number of households have low vehicle access

or a significant number or share of residents are more than 20 miles away from super market access.

B2.3   Food Desert Zone Zeemaps Integration

B2.3.a   Greensboro, Elon, Burlington

B2.3.b   9 County Area

Appendix C   Interviews

C1 Questionnaire used for interviews

Case Study Questionnaire (Talking Points)
1. Can you tell us why you farm?
· Are you a 1st, 2nd, or 3rd generation farm/business?
· How did you start your farm/business?
2. Can you tell us about your farm organization?
· What information is hard to obtain in relation to how your business works?
· What information was hard to find when you first started? How does it compare in today's society in terms of profit, liability and food safety requirements?
3. Could you please tell us how you market your product?
· Where do you sell your products?
· How involved are you with your food distribution network?
4. How do you currently connect/communicate with your local food distribution network?
· What form of communication do you use to communicate with distributors and consumers?
· Where do you get your information about your local food distribution network?
5. What type of information do you get online?
· What forms of the Internet or social media do you use (i.e. Facebook, local websites)?
· Are you a part of any kind of online community?
6. How can we create a better market for your business using the Internet?

    C1.1

C2 Survey Data

Business	Specialties	Online outreach	Facebook (y/n)	Project idea (y/n)
Mike's Honey	Honey	Alamance County Beekeepers	Yes	Yes, but likes making connections in person
The Farm Fairy	Cheese	Website/uses e-commerce	Yes	Yes, loves the idea about connecting on map
Jillie's Jams	Jams	Had a website	Yes (solely uses FB b/c it's free)	Yes, says she would use it if it is localized
Mebane Hydroponics	Collards	On Local Harvest	Yes	Yes, he would use it if it was available
Reedy Fork Farm	Dairy	Website	Yes	Yes, loves the idea

Maple View Farm	Dairy	Website	Yes, over 2,000 likes	Yes, thinks it's a great way to connect
Buttke Dairy Enterprises	Dairy	No website	No	No, could be a good idea but does not foresee it being a success for their business
Riverside Dairy Farm	Dairy	No website	No	Yes, but are happy with the connections they've made in their community
Homeland Creamery	Dairy	Website	Yes	Yes, absolutely love our project
Fogleman Dairy	Dairy	No website	Yes	Mixed response; would like it if someone did the online work for their farm
Calico Farmstead Cheese, LLC	Dairy	Website: Local Harvest	Yes	Yes, improve on the concept of Local Harvest
Dodge Lodge Farm	Produce	Website: Local Harvest	Yes	Yes, loves the idea of "Foodbook." Sold on the idea of using pictures
Ashe County Cheese	Dairy	Website/use golocalncfarms	Yes	Yes, love "FoodBook" said that they would use it
Cardais Gourmet	Bakery	Website/use golocalncfarms	Yes	Yes, but would only join if it became a popular site for entrepreneurs to use
Carl Pless Jr. & Sons Farm	Produce	No website but do you golocalncfarms	Yes (18 likes)	Yes, but need a lot of support before joining
Creekside Farms	Produce	Website	Yes	Yes, thinks we are heading in the right direction
Rowland's Row Family Farm	Produce	Own golocalncfarms	No	Yes, they are still learning about the business and think every little marketing strategy goes a long way**
Celebrity Dairy	Dairy	Website	No	Yes/no, the beauty of small-scale agriculture is

				the reputation of the farm built up from word-of-mouth
Dairy Fresh	Dairy	No website	No	Yes, sees a need to revamp marketing strategies
Cornucopia Cheese	Gourmet cheeses	Website	Yes (28 likes)	Yes, love the idea for the interactive map

C3 Interview Findings

Table C3. The interview findings show that respondents have a strong internet presence.

Findings	**Responses to online outreach**
Internet presence	16/20
No internet presence	4/20
Website	10/20
On other websites (e.g., Local Harvest)	6/20
Facebook	15/20

Appendix D FoodBook

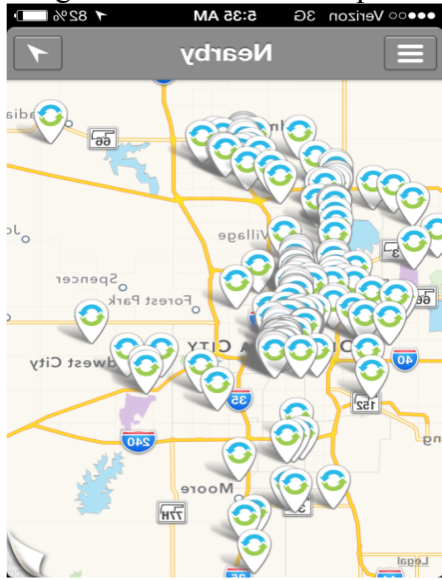**D1** Examples of Interactive Media Techniques

D1.1 Local Harvest

Image D1.1. Interactive map that is found on the Local Harvest website homepage.
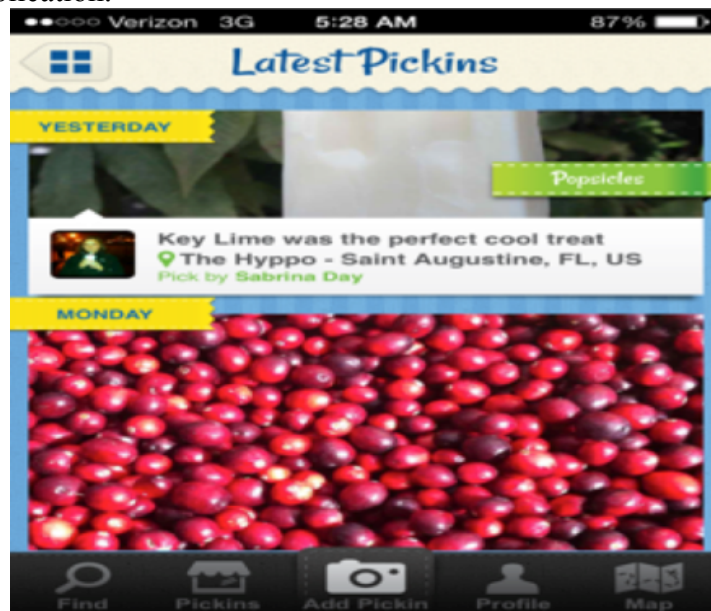

D1.2 Keep it Local

Image D1.2 Interactive map found on the Keep it Local mobile application.

D1.3   Local Pickins mobile application

Image D1.3 Example of the "Photo Sharing" feature on the Local Pickins mobile application.

D1.4   Local Pickins

Image D1.4 Local Pickins user profile sign in page with option to sync login to Facebook.
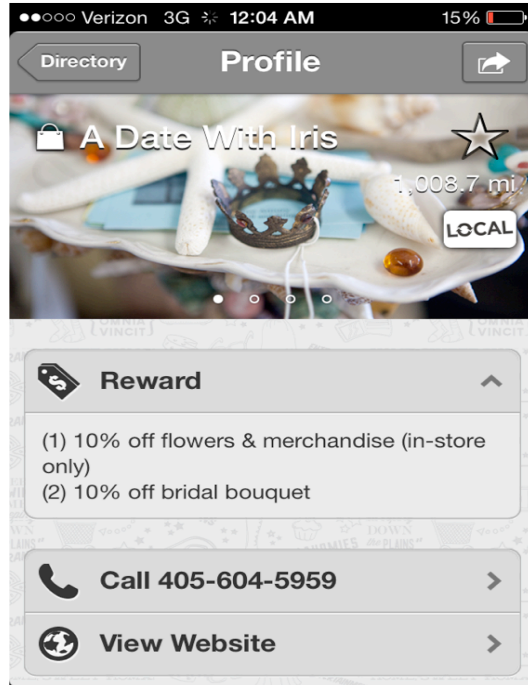
D1.5 Local Dish

Image D1.5 Example of the Local Dish event sharing feature

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D1.6 Keep it Local membership

Image D1.6 Example of the Keep it Local membership discounts through the mobile application.

D1.7   More stuffs……….

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Miscellaneous