LOCAL FOOD SYSTEM INVESTMENT: A PROPOSAL FOR A NOVEL AND TARGETED APPROACH

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PRELIMINARY RESULTS: PLEASE DO NOT QUOTE

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INTRODUCTION

There is significant competition for local and state resources to support development of infrastructure for the local foods movement. These resources, however, are frequently allocated to locations which have political persuasion rather than those that are necessarily good locations for food system development. As such, limited local food system (LFS) resources are not efficiently allocated. With the intent to offer an improved strategy for allocating local food system resources, this study proposes a novel approach to identifying areas which would be appropriate for local food system development.

Successful local food systems bring buyers and supply of these products together in place. The objective of this study is to explore to the potential of geographical information system tools to help guide prioritization of local food system investment. Through the use of GIS mapping, locations that are sites of production for agriculture output commonly marketed through local food systems (specialty crops) are identified. Overlaying these sites of current LFS supply, with areas that have sufficient nearby demand potential offers important insight into where LFS systems might flourish. These sites can then be compared with current locations of LFS infrastructure to determine candidate sites of insufficient, adequate, or overinvestment. Results from this approach are likely to be useful to areas that are suitable candidates for a LFS but whose local planners have not been successful in generating sufficient support for its development.

This study examines LFSs in South Carolina as an instructive case example. The enhancement of local food systems has the potential to offer much to South Carolina. Due in part to the depletion of the state's textile industry, South Carolina has a historically persistent high rate of unemployment, ranked the 38th highest in the United States in November of 2012 (BLS 2012). According to the USDA, local food systems have a net positive impact on local economies, create opportunities for training, and provide business skill development, these benefits would greatly benefit this region. In addition, the state has among the highest rates of obesity the United States (CDC 2012) as well as food insecurity (ERS 2012). Therefore, from an economic development and a health perspective, there is both the need and opportunity for significant enhancement of LFSs in the state.

DATA AND RESEARCH METHODOLOGY

Geocoded data of both the area's attributes needed to support farm supply, consumer demand for LFS products, and infrastructure were obtained and mapped. Details of the approach used to construct each of these primary data components are described below:

Identifying sites with LFS infrastructure:

For the purposes of this analysis, local food infrastructure sites are identified as farmers' markets, kitchen incubators, and food hubs. Using a multistep approach, an inventory of these sites in South Carolina was developed. First, information detailing local food infrastructure in South Carolina was obtained through the USDA-Agricultural Marketing Service. Specifically, a geocoded list of farmers markets (USDA-AMS, 2013a), and a list of food hubs were obtained through this source (USDA-AMS, 2013b). This information was supplemented by a list of Community-Based Farmers Markets which is available through the South Carolina Department

of Agriculture (SCDA, 2014). Finally, an extensive internet search was conducted to identify other farmers' markets, food incubators, and food hubs in S.C. which were not previously identified through the previously mentioned sources. A total of 147 farmers' markets, 3 food hubs, and 1 kitchen incubator were identified through this process.

Determining demand for local foods:

Published studies (20+) of local food demand were reviewed to identify characteristics of those most likely to shop for local foods, and the radius these individuals are willing to travel. Individuals aged 35 and over with incomes between $60,000-$100,000 and at least a college degree were identified as most likely to buy these products.

The US Census Bureau's American Community Survey (ACS) geospatial layer (2007-11) provided demographic data for each Census tract for the state. Census tracts with household income equal to or greater than $60,000 were selected using ArcGIS software (ESRI, 2012). Of the 1,103 Census tracts within the state, 189 fit this criteria. Additional demographic information including percentage persons attaining a bachelor degree or higher, percent of population aged 35 years or older and percent female population were included and summarized for the demand Census tracts. With these additional criteria, 164 sites were identified as those most likely to be important sites of demand for LFS products.

Determining supply of produce:

The USDA-National Agricultural Statistics Service (NASS) produces the Cropland Data Layer (CDL), a geospatial land cover raster dataset (30 meter pixel size) with a detailed list of 109

agricultural categories and 25 non-agricultural landcover categories. The NASS first created the CDL for the mid-Atlantic states as a one-time effort in 2002, but began annual releases of the layer in 2008. Over the years accuracy of the CDL has increased. The most recent version of this dataset, 2012, was selected for this analysis.

The South Carolina 2012 CDL layer was reclassified to remove all non-ag categories and combine the many non-commodity vegetable and fruit crops (including peaches, pecans, cantaloupes, squash, grapes, berries, etc) where products supply the state's farmers markets, hubs and co-ops. In order to determine whether the supply areas were within reasonable proximity to both sites of expected demand (Census tracts), and sites which currently have LFS infrastructure, the average farmers market vendor travel distances reported in Lohr et al. (2011) were used. While these authors found that the distance vendors commute varies by market size (commute longer distances to larger markets), on average a 30-mile supply radius around sites of specialty crop production was used.

Analysis

Through evaluating the geographic intersections of the supply, demand, and infrastructure information, the following scenarios will be considered:

Scenario 1: Current Sites of LFS Infrastructure

An important step in this analysis will be to verify the extent to which this approach can predict successful LFSs. To this end, locations which are identified as boasting both the supply and

demand characteristics needed to support a LFS are compared against locations which already have successful local food systems.

Scenario 2: Sites of Potential Excess or Misallocated LFS Capacity

Locations where there is infrastructure, but not sufficient demand for LFS products.

Scenario 3: Sites to Consider for Potential Investment

Locations where there is sufficient LFS demand and supply, but currently there is no LFS infrastructure.

RESULTS AND DISCUSSION:

The average distance people are willing to drive to visit farmer's markets (excluding markets in metro areas of >250,000 populations) is 13.3 miles (Ragland and Tropp, 2006). Using spatial tools in the GIS software, sites where location food infrastructure is situated within the 13.3 mile radius of locations identified to have high potential LFS demand are identified. These sites are identified as the black triangles in Figure 1.

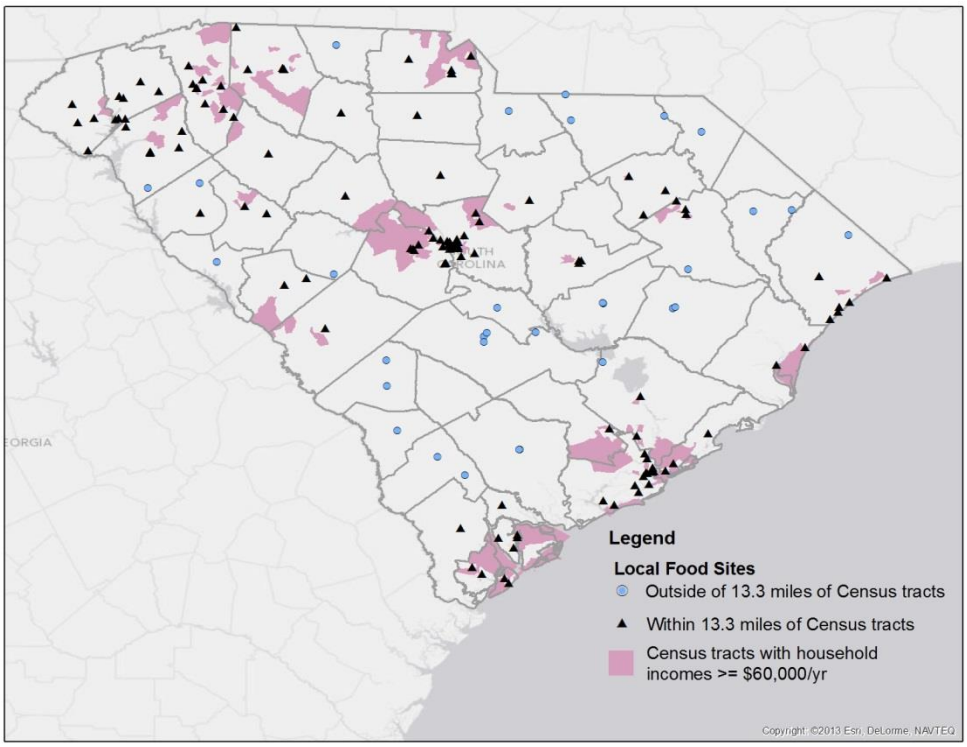

Figure 1. LFS infrastructure sites in proximity to locations of high potential LFS product demand

South Carolinas soils, rainfall, average temperatures, and relative rurality make the state a good location for the production of a wide variety of fruits and vegetables. In Figure 2, current locations of specialty crop production (indicated in red) are examined in concert with sites of potential LFS product demand, and LFS infrastructure. As specialty crop production is widely dispersed throughout the region of focus, proximity to local food supply was not found to be a geographic constraint to the development of LFS markets. As such, it is the proximity to LFS demand that has, and will continue to, be the predominant driver in shaping the development of South Carolina's LFS infrastructure.

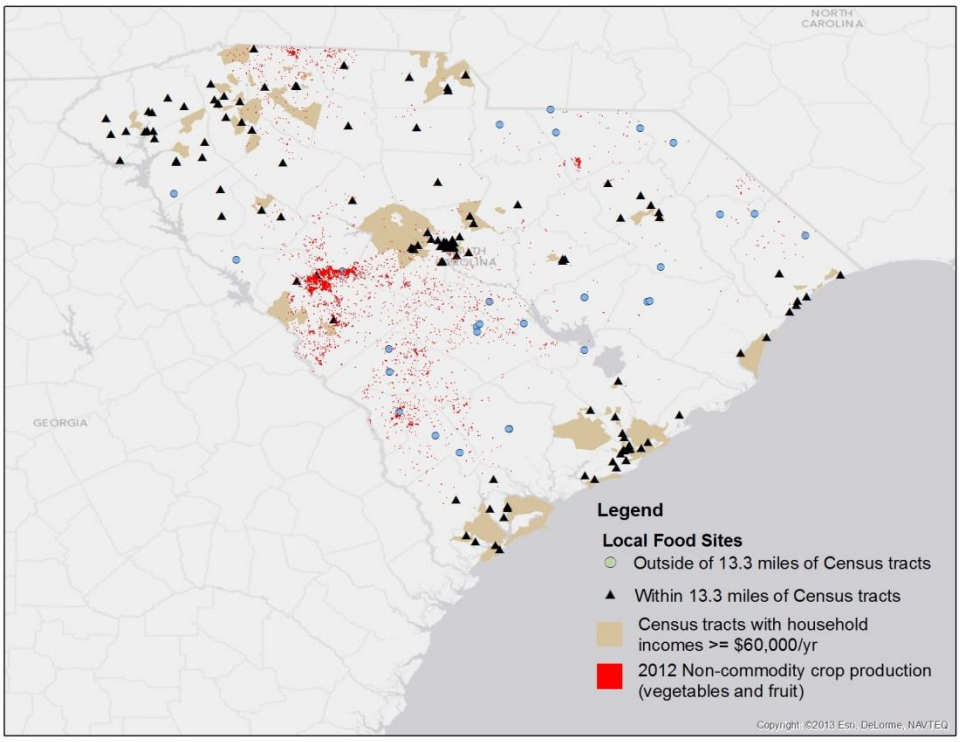

Figure 2. LFS infrastructure sites in proximity to locations of high potential LFS product demand, and current supply

Scenario 1: Current Sites of LFS Infrastructure

Of the 164 LFS infrastructure sites, 135 were situated within usual driving radius' of both potential LFS demand and existing supply. This large extent to which sites of current LFS infrastructure overlap with locations where infrastructure would be predicted, provides evidence of the appropriateness of this approach.

Scenario 2: Sites of Potential Excess or Misallocated LFS Capacity

Locations indicated in blue in Figure 2 are LFS infrastructure sites which are located outside of the radius LFS consumers are usually willing to travel to procure these products. A total of 29 such sites been identified.

These locations were not identified as good candidate locations for LFS infrastructure investment. As such, should these sites be successful and sustainable, it would suggest that that methodology employed herein has omitted or used improper thresholds for one or more important predictive criteria. Alternatively, should it is possible that these locations have had recent infrastructure investment, but which do not have a sufficient base of LFS consumer to sustain them. In such cases, this LFS capacity could be considered misallocated, and the time and other resources used to support these sites better used elsewhere. Additional research effort will be needed to disentangle which of these (or an alternative) explanation accounts for the presence of these sites.

Scenario 3: Sites to Consider for Potential Investment

A third analysis will investigate whether there are areas within the state which are currently producing fruits and vegetables and are located near the high demand Census tracts which currently do not have local food site infrastructure. This analysis is currently underway.

CONCLUSIONS AND FUTURE RESEARCH

This study proposes a novel approach to identifying locations appropriate for LFS development. Using South Carolina as a case study, the proposed approach was successful in identifying and differentiating sites which would be particularly suitable for LFS investment. Local and state agencies and NGOs looking target future investment into LFS areas would be well served to look to these sites as first candidates.

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