

Local Government Sustainability Initiatives and City-Run Farmers' Markets

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Abstract

The number of farmers' markets in the U.S. has quadrupled since the mid-1990s. Typically administered by vendors and volunteers, as farmers' markets have increased in popularity, some cities have incorporated administering farmers' markets into their local government services. Farmers' markets are uniquely situated to have tangible impacts on the "Three E's" of local sustainable development; collectively addressing the environment, economy, and equity. I aim to address the gap in the existing literature on the role city-run farmers' markets are playing in advancing these "Three E's". I operationalize a Sustainability Index to assess the relationship between sustainability actions taken by farmers' markets, whether or not a farmers' market is run by a local government, and key demographics of a farmers' market surrounding community. Ultimately, I find that being city-run is the strongest predictor of a farmers' market Sustainability Index. This work begins a conversation on the role of city-run farmers' markets in community and their capacity to address local government sustainability initiatives.

Farmers' markets in the United States have quadrupled in number since the mid-1990s. Traditionally loosely organized and vendor-run, as farmers' markets have increased in popularity and become more mainstream, some cities have incorporated organizing a farmers' market into their local government services. Also booming in the mid-1990s, cities across the U.S. began to incorporate specific sustainability measures into their comprehensive planning and developed coalitions to shape policies to support local sustainable development (Saha and Paterson 2008; Saha 2009). Scholars have pointed to farmers' markets as tools for supporting local and organic agriculture, strengthening local economies, and increasing access to healthy food for low income communities (Alkon and Agyeman 2011). These areas of impact align with the three interrelated goals of sustainable development: environmental protection, economic development, and social equity (collectively known as the "Three E's"). The interdisciplinary nature of farmers' markets holds promise for tangible outcomes that holistically address environmental, economic, and equity-based goals; farmers' markets are uniquely placed to impact how food is produced, how it is distributed, and to whom it is sold. There is no existing scholarly literature addressing the intersection of local government sustainability initiatives and the role city-run farmers' markets are playing in advancing the Three E's of sustainability.

To explore this intersection of local government sustainability and the local food system, I begin with the existing literature on local government sustainability initiatives. Following, is a discussion of the rise in farmers' markets in the United States and their role in the local food system. I then present a quantitative model that measures the relationship between the number of sustainability actions taken by farmers' markets, whether or not a farmers' market is run by a local government, and key demographic indicators of the farmers' market's surrounding community. Ultimately, this work contributes to the literature on local government sustainability initiatives by exploring how cities are using farmers' markets as tools for implementing local sustainability initiatives by including the management of a farmers' market as part of their local government services.

Local Government Sustainability Efforts

Cities are often cited as necessary actors in implementing innovative policy for social change. The United Nations specifically called cities to action at the 1992 Earth Summit in Rio De Janeiro with the passage of Agenda 21. Article 28 (also known as Local Agenda 21) specifically addresses the role of local governments and their responsibility to develop a local action plan for sustainability to help address larger international disparities in health, income and sustaining ecosystems (UNCED 1992; Saha 2009). Cities are called to action not only because of their perceived ability to make local change, but also because of their role in perpetuating environmental degradation. As Mark Roseland (1992) writes in his foundational work following the 1992 Earth Summit, “the role of the cities of the industrial world deserves much more scrutiny in the context of human settlements and the environmental crisis, precisely because their impact on the world's changing ecosystems is so enormous” (22). The ecological footprint of cities has both local and global impact: urban sprawl, dependence on cheap energy, resource consumption, and air and water pollution. The 1992 Earth Summit is pointed to in local government sustainability literature as a global wake-up call for cities to claim responsibility and take action.

A decade later, The International Council for Local Environmental Initiatives (ICLEI) found 6,416 local authorities in 113 countries had made a formal commitment to Local Agenda 21 (Saha 2009, 21). The ICLEI survey found significantly fewer U.S. communities meeting Local Agenda 21 criteria compared with other industrialized nations. As is still reflected in U.S. public policies today, “this would suggest that the USA is lagging behind with respect to progress towards a sustainable future” (Saha 2009, 21). Within sustainability literature, scholars have defined sustainability broadly as the ability to meet the needs of the present without compromising the ability to meet the needs of the future. In order to do this, sustainable development must address “three interrelated and equally important pillars; environment, economics, and social justice or equity”

(Opp and Saunders 2012, 679). However, scholars assessing sustainability initiatives at the city level have found that although local governments are embracing sustainability initiatives, there is more focus on the ecological dimension than meaningful strategies to address the economic and equity pillars of sustainable development (Saha and Paterson 2008). This approach is seen in many of the objectives of Local Agenda 21 with focus primarily on addressing local and global environmental concerns. Additionally, the National League of Cities' Sustainable Cities Institute exclusively focuses on addressing climate change at the local level through strategies for environmental protection of air, water, and land (NLC 2018). Although these strategies are vastly important in addressing environmental degradation and climate change mitigation, the emphasis is largely environmental, ignoring the economic or social aspects of sustainability. Despite a lack of evidence that an interdisciplinary approach to sustainability is being applied at the local level more broadly, scholars believe that, in order for cities to be truly sustainable, they must be rooted in the interconnections between the environment, economy, and equity (Saha 2009; Alkon and Agyeman 2011; Opp and Saunders 2012).

Local Government Sustainability Literature: Within the local government sustainability literature, there are five primary studies that have surveyed local governments and provided taxonomies of policies and techniques deemed to be “sustainable” (Portney 2003; Jepson 2004; Conroy 2006; Saha and Paterson 2008; Opp and Saunders 2012). Local government sustainability literature has focused on three areas: 1) how sustainability is incorporated into policies to create more sustainable communities, 2) case studies of individual cities and their efforts in implementing sustainability policies, and 3) “attempts to measure the extent to which local governments are embracing sustainability principles by adopting various initiatives” (Saha 2009, 18). The policies and actions evaluated in the literature were modeled on findings in previous sustainability research (Jepson 2004; Conroy 2006; Opp and Saunders 2012), expert panels (Saha and Paterson 2008), and known sustainability initiatives based on case studies (Portney 2003). Recently, two of these studies contribute to the

literature by widening the scope beyond ecological dimensions of sustainability to include a more holistic assessment of city incorporation of the “Three E’s” of sustainability (Saha and Paterson 2008; Opp and Saunders 2012).

In cross-referencing all five of the local government sustainability initiative studies, there is minimal explicit mention of food and agriculture as a feature of sustainability policies and strategies. This is a crucial oversight. As shown in city planning literature, incorporating food systems is vital to the well-being and sustainability of cities (Pothukuchi and Kaufman 1999; APA 2007; Jenkins et. al. 2014; Buchan 2015; Campbell 2016). The primary source for industry research and best practices in city planning comes from the American Planning Association (APA). The APA has fostered a space for city planners to be more thoughtful about how food systems are incorporated in rural and urban comprehensive planning. Although there are numerous case studies of specific sustainable food system initiatives and a policy guide on community and regional food planning from the APA, there is no large-scale analysis of if and how American cities are incorporating food systems into local government sustainability initiatives.

Pothukuchi and Kaufman (1999) wrote a seminal article that placed food systems within the scope of urban planning. This work broadened the scope of city planning agencies to incorporate food systems just as they would economy, public health, environment, land use, and other community systems. Pothukuchi and Kaufman are credited with placing food systems in modern applied and academic planning strategies and literature. However, this does not mean that food systems have been absent in the history of city planning. In 1898, Ebenezer Howard (1965) set forth a detailed vision for the “Garden City”. This is a foundational work within planning literature, establishing the ideal community, one he deems a “Garden City,” as a balance between town and country (Howard 1965). Central to his plan for the ideal “Garden City” is its close proximity to

agricultural lands. Even in the late nineteenth century, Howard (1965) writes of the globalized food system: “Persons are perfectly free to get their foodstuffs from any part of the world... these farmers [in “Garden City”] are hardly likely to supply them with tea, with coffee, with spices” (61). However, “Garden City” provides “a ray – a beam of hope... for the home-producer, the farmer of “Garden City” has a market at his very doors” (Howard 1965, 61). This idea of narrowing the path from production to consumption is at the root of developing a healthy city. Globalization’s influence on the global food system and, therefore, how communities feed themselves, has vast and complicated consequences. Therefore, building local sustainability through access to food has been seen more in concept than application (Campbell 2016). Despite barriers, community planners and local governments are being encouraged by the APA to tap into historical elements of city planning and embrace local food systems as a means for strengthening communities environmentally, economically, and socially. A key player in the local food movement, and a primary actor in city planning strategies for strengthening local food systems, is the farmers’ market.

Rise of Farmers’ Markets

The creation of farmers’ markets is rooted in narrowing the path from production to consumption for the benefit of both producers and consumers. Indeed, “farmers’ markets could be considered the historical flagship of local food systems” in the United States (Brown and Miller 2008, 1296). However, there is scant research on farmers’ markets in the context of the local food movement before the mid-twentieth century. This is largely credited to the difficulty of measuring direct-to-consumer sales and the varying definitions of what constitutes a farmers’ market (Brown 2002). The U.S. Department of Agriculture (USDA) counted only 340 farmers’ markets in the United States as of 1970, down from around 500 post-World War II (Brown 2001). In the face of a globalized food system and the ease with which produce could travel cross-country, farmers’ markets could not compete with grocery retailers’ size, scope, and price

following the Green Revolution and the shift to industrialized agriculture in the mid-twentieth century.

Recognizing this asymmetrical playing field and loss of a key revenue stream for small-scale farmers, U.S Representative Rick Nolan (D-MN) sponsored the Farmer-to-Consumer Direct Marketing Act of 1976 to establish a priority within the USDA of supporting direct marketing of agricultural goods between producers and consumers. The Act designated federal funds to promote “the development and expansion of direct marketing of agricultural commodities from farmers to consumers” (Public Law 94-463, 1976). The Act states the Secretary of Agriculture will coordinate a program “designed to facilitate direct marketing from farmers to consumers... in a manner calculated to lower the cost and increase the quality of food to such consumers while providing increased financial returns to the farmers” (Public Law 94-463, 1976). The Act designates funds be distributed to each State for a variety of activities that promote direct-to-consumer sales, including sponsoring conferences for information sharing between farm producers and consumers, compiling laws and regulations for direct marketing, and providing technical assistance to establish direct marketing arrangements (Public Law 94-463, 1976). Following the Farmer-to-Consumer Direct Marketing Act, there was a huge rise in the establishment of farmers’ markets across the country (Brown 2001). The 340 farmers’ markets in 1970 grew to over 3,000 farmers’ markets by the turn of the twenty-first century (Brown 2002). And in the less than two decades since, that number has almost tripled to 8,717 farmers’ markets listed in the USDA National Farmers’ Market Directory as of early 2018 (USDA 2018). This immense growth has been “variously attributed to factors of changing consumer interest and the changing economics of agriculture” (Brown 2002, 167). The federal level support for promoting direct to consumer sales created space for state and federal agricultural agencies to provide technical assistance to vendor-run farmers’ markets, which were then able to form with limited restrictions.

Additionally, small farmers had vested interest in working collaboratively to sell at farmers' markets to diversify their revenue sources and reach bigger audiences. Coupled with a sea change in consumer interest in local food - in the past two decades, buying local and organic has become part of the mainstream consumer culture - farmers' markets are seen as core to the local food movement.

The Farmer-to-Consumer Direct Marketing Act of 1976 was amended in the Agricultural Act of 2014, the most recent omnibus "farm bill". The amended Act established explicit guidelines for what each State would be tasked with in regard to farmers' markets, specifically. Section 5b states that the Secretary of Agriculture will work with governors and state agriculture agencies to develop programs to train farmers' market managers, develop opportunities for information sharing amongst farmers' market managers, train state extension service staff to provide technical assistance in direct marketing techniques, and work with producers themselves to develop farmers' markets (Public Law 113-79, 2014).

Additionally, the amended Act established the Local Food Promotion Program (LFPP) to provide federal funds to promote direct farmer to consumer marketing and support local food business enterprises. The LFPP provides categorical grants with a required 25 percent match to eligible entities including nonprofits, economic development corporations, producer networks and associations, and local and tribal governments. Ten million dollars was allocated to the LFPP for each fiscal year between 2014 and 2018, with half of the funds to promote direct-to-consumer opportunities (such as farmers' markets) and the other half to local and regional food businesses that "process, distribute, aggregate, or store locally or regionally produced food products" (Public Law 113-79, 2014). The amended Act also states that priority will be given to LFPP applications for projects "that benefit underserved communities, including communities that are located in areas of concentrated poverty with limited access to fresh locally or regionally grown foods" (Public Law 113-79, 2014).

This priority to focus on underserved communities represents the more recent study of using farmers' markets as tools for providing access to healthy food for consumers in food deserts (Alkon and Agyeman 2012).

With this explicit focus on equity, scholars and advocates (and the call to action in the 2014 Farm Bill) have highlighted the potential for farmers' markets to act as tools to support local and organic agriculture, strengthen local economies, and increase access to healthy food for low income communities (Alkon and Agyeman 2012; Public Law 113-79, 2014; Campbell 2016).

Farmers' Markets as Tools for Sustainability: The Farmers Market Coalition, a large national advocacy group for farmers' markets and food access, defines a farmers' market as occurring on a regular basis and:

Organized for the purpose of facilitating personal connections that create mutual benefits for local farmers, shoppers and communities. To fulfill that objective farmers' markets define the term local, regularly communicate that definition to the public, and implement rules/guidelines of operation that ensure that the farmers' market consists principally of farms selling directly to the public products that the farms have produced (Miller, Thompson, and Kalb 2013, 3).

The Farmers Market Coalition explicitly calls on local governments to incorporate farmers' markets in to their master plans as a means of capturing "the triple bottom line of economic, community and public health benefits inherent in successful farmers' markets" (Miller, Thompson, and Kalb 2013, 3). Additionally, the National Conference of State Legislatures has a webpage explicitly dedicated to farmers' markets, which highlights how states and municipalities are creating policies to foster their growth to support access to healthy food for low income communities.

In a case study of the historic city-run Ann Arbor Farmers' Market in Michigan, there is a clear connection between local government initiatives and support for the surrounding ecosystem. In the interest of supporting farmland for local food production and the associated economic

opportunities through the Ann Arbor Farmers' Market, the city established a partnership to preserve agricultural lands in the face of urban sprawl. To date, more than 4,300 acres have been protected and at least eight protected farms are currently producing specialty crops for local markets (Goddeeris, Rybnicek, and Takai 2015). Additionally, there has been widespread support for farmers' markets role in lessening "food miles" or the amount of transport (and therefore carbon emissions) necessary to deliver food from farm to table. Not all farmers' markets require the products sold to be certified organic or grown with organic practices, but many small-scale farmers selling at farmers' markets participate in more environmentally sustainable means of growing than their large-scale counterparts.

The Mayors Innovation Project, a national learning project among U.S. mayors, released a report for local governments in 2014 focusing on the importance of fostering a local food economy. Although not addressing farmers' markets specifically, the report discusses methods to promote a city's "food cluster," or the food businesses within the city that grow, process, transport, or sell food (Jenkins et. al. 2014). The Mayors Innovation Project report states, "cities should include local food as part of their economic development efforts... nationally, the trend is toward local food - cities should take advantage of this" (Jenkins et. al. 2014, 11). The report provides a case study of San Francisco's approach to sustainability through food. Following Mayor Gavin Newsom's executive directive to create a comprehensive food policy in San Francisco, the city created a food policy council, directed city departments to procure locally grown food, promoted food production on city-owned land, encouraged local food marketing, and mandated education about sustainable food systems (Jenkins et. al. 2014, 8). Again, although this is a more comprehensive approach than just a city-run farmers' market, it is one example of how cities are showing a commitment to incorporating local food promotion as part of larger initiatives to utilize a city's capacity to support environmentally, economically, and socially sustainable solutions to globalized agriculture.

The American Planning Association calls on city planning to include farmers' markets as a tool for addressing health inequity. In their

policy guidelines for food systems planning, the APA calls on planners to “develop plans and redevelopment proposals for food insecure areas with sites and incentives for community gardens, entrepreneurial urban agriculture projects, *farmers’ markets*, neighborhood grocery stores, and food assistance programs [emphasis added]” (APA 2007). Much of the focus at the municipal level has included SNAP/EBT acceptance at farmers’ markets as a solution to hunger and food security. According to the National Conference of State Legislatures (NCSL), at least a dozen states have adopted legislation that promotes and provides funds and technical assistance to farmers’ markets looking to accept SNAP/EBT as payment. These policies and programs are essential because accepting EBT cards is a barrier for many farmers’ markets due to the additional costs and infrastructure needed to process this type of payment. The NCSL writes, “farmers’ markets often are not able to accept SNAP electronic benefits transfer (EBT) cards... denying these markets access to the \$78 billion in SNAP assistance received in 2011” (NCSL 2015). Not only does lack of capacity to accept EBT cards exclude consumers using SNAP benefits, but also precludes local farmers and food businesses from tapping into this large pot of federal funds.

With increasing access to underserved populations in mind, it is important to note that farmers’ markets have been critiqued, along with other elements of the local food movement (such as locavorism and “buy local” campaigns), as being shaped exclusively by the preferences of wealthy, well-educated, white women (Alkon and Agyeman 2012; Mallory 2013). Although outside of the scope of this paper, a more in-depth assessment of how race, income, and gender intersect with the local food movement, specifically farmers’ markets, is essential for assessing the intentions behind city-run farmers’ markets.

City-Run Farmers Markets: There is currently no scholarly literature that looks specifically at the role of city-run farmers’ markets as a local government

sustainability initiative. Much like the general local government sustainability literature, there is some focus on case studies (Goddeeris, Rybnicek and Takai 2015). There have been guides provided by farmers' market advocacy groups, the American Planning Association, and the Mayors Innovation Project, but there is little focus on the extent to which cities are incorporating farmers' markets into their sustainability plans or measuring the extent to which city-run farmers' markets are being used as a tool for sustainability.¹

According to the USDA's most recent survey of farmers' market managers, "most farmers' markets are operated by nonprofit organizations and more than 60 percent of them are managed exclusively by volunteers" (Miller, Thompson, and Kalb 2013, 7). Much of the literature on farmers' markets is provided by the USDA or farmers' market and food access advocacy groups like the Farmers Market Coalition, Community Food Security Council, and Wholesome Wave. The Farmers Market Coalition makes reference to city-run farmers' markets, stating local government "involvement in farmers' markets spans a wide spectrum of possible roles. Some city governments host and manage farmers' markets, such as the Market at the Square in Urbana, Illinois, or the City Market in

¹ There is some literature about early municipal markets and the role cities played in fostering marketplaces. The existence of these more general city-affiliated markets falls outside the scope of this research, but it is important to note that in the colonial United States farmers' markets served as the primary source for urban residents to buy food supplies. In 1946, John L. Wann wrote an extensive history of markets, focusing specifically on farmers' produce markets, with funding from the USDA. He writes, in colonial times "nearly every town of any importance had its marketplace where farmers brought their farm products for sale to or exchange with the folks in the city" (Wann 1948, 3). However, as the country shifted from mercantile settlements to industrial cities, "the farmers' produce markets became proportionately less important in the overall food distribution system" (Wann 1948, iii). As consumer preferences are changing, and citizens are placing value on supporting local farmers and local economies in the face of a globalized food system, some cities are once again providing marketplaces for the exchange of locally produced goods.

Charlottesville, Virginia” (Miller, Thompson, and Kalb 2013, 4). Alternatively, some cities waive costs for the use of public parks to host farmers’ markets, close down public streets for the use of farmers’ markets, or advertise the local farmers’ market on public signs and marquees. However, there is no curated data available for how many of the over 8,700 farmers’ markets in the United States are hosted and managed by local governments.

Data and Methods

Are cities including the management of a farmers’ market in their local government services? And if so, how are cities using farmers’ markets as tools for implementing local sustainability initiatives to address the Three E’s of sustainability? In an attempt to quantify the incorporation of sustainability initiatives acted upon by farmers’ markets (both run by cities and run by other entities), this research has incorporated the voluntary data provided to the National Farmers’ Market Directory administered by the USDA Agricultural Marketing Service (USDA 2018). Every farmers’ market in the United States is able to provide their market’s information on this online forum. The Directory includes space to provide a location, hours, products sold, and types of payment accepted in addition to the farmers’ market website, market manager contact information and social media platforms. The Directory is widely publicized through farmers’ market publications, state agriculture agencies, and extension agencies. There are 8,714 U.S. farmers’ markets included in the overall dataset.² Because of the robustness of use and number of farmers’ markets included in the

² Because the Directory is constantly being updated, this research design uses the Directory results found on March 8, 2018 to provide a constant data source. Directory information is not archived, at least in a way accessible to the public. To see the dataset used in this study, please contact the author.

Directory, this is considered the most relevant and comprehensive source of data on farmers' markets in the United States.

There is no comprehensive data source that includes the specific indicators needed for this research design and so I generated an original dataset. Due to limited time and resources, this search was reduced to the scope of farmers' markets in one state, Minnesota.³ There are 191 farmers' markets in Minnesota that are included in the findings. Five farmers' markets from Minnesota were removed from the study because they did not meet the definition of a farmers' market as provided by the Farmers Market Coalition.⁴

Operationalizing sustainability initiatives in the context of the farmers' market includes three determinants, each representing one of the "Three E's." Because of the limited data, the measure of sustainability is limited to the data available from the National Farmers' Market Directory. A "Sustainability Index" was operationalized as a count of activities, including the following: the farmers' market 1) reports as certified organic; 2) sells more than ten types of goods; and 3) accepts one or more alternative forms of payment (SNAP, WIC or Senior Farmers' Market Nutrition Program vouchers). The environmental proxy of reporting as certified organic represents an intentionality to support farmers who reduce their pesticide use, protect water and soil quality, and take additional measures to promote environmental health. The economic proxy of product diversity represents an intentionality to support diverse local producers and food businesses. The equity proxy represents an intentionality to increase access to healthy food through the acceptance of federal benefits given to low income individuals and families.

There is currently no academic literature that explores the capacity of city-run farmers' markets to execute sustainability initiatives through the

³ Minnesota was selected as the state of interest because of my familiarity with Minnesota farmers' markets through previous professional and academic research.

⁴ The five farmers' markets excluded from the study did not have a set location, did not sell locally produced farm products (selling only crafts does not constitute a farmers' market), or had no web presence through either a state or regional directory of farmers' markets, webpage, or a Facebook page.

incorporation of a farmers' market into local government services. There is limited theoretical framework to support that city-run farmers' markets would be more or less "sustainable" than their counterparts. However, given the federal priority in the most recent Farm Bill, the numerous best practice guides written to encourage local governments to support farmers' markets, and the capacity of cities to implement sustainability initiatives more broadly, I assert that the operator of a farmers' market will have a significant impact on a farmers' market's Sustainability Index. The Sustainability Index I created is applicable to any farmers' market, regardless of operator, and therefore, the primary hypothesis states the key independent variable (the operator of a farmers' market) will have a positive relationship with the dependent variable (Sustainability Index).

H1: City-run farmers' markets will have a significantly higher Sustainability Index than farmers' markets run by other entities.

Within the local government sustainability literature, there is indication that adoption of sustainability initiatives is related to the demographics of a community. In their comprehensive quantitative assessment of local government sustainability initiatives, Opp and Saunders write: Certainly, it is evident that several factors are interrelated to local government engagement in sustainability initiatives, including population size, central city locations, diversity, ethnicity and race, political leanings of a community, and region. Untangling these relationships will require additional quantitative modeling coupled with deeper qualitative inquiry (Opp and Saunders 2012, 695).

There are no consistent findings that indicate one demographic measure is more predictive than another in terms of local government placing priority on sustainability initiatives. However, some common indicator variables included in local government sustainability literature include metropolitan statistical area type (i.e. urban, suburban, and rural),

age, income, racial diversity, education level, and presidential vote (Saha 2009, Portney and Berry 2010, Opp and Saunders 2012). Based on the existing literature, the following hypothesis – and subsequent sub-hypotheses - are rooted in overall predictors of local government sustainability initiatives as opposed to incorporation of farmers' markets, specifically.

H2: Demographics of a farmers' market's surrounding area will have a significant impact on a farmers' market's Sustainability Index.

The Sustainability Index is an event count variable that is measured categorically from 0 to 3 (an observation of 0 indicates a farmers' market has no sustainability activities and 3 indicates a farmers' market has all three sustainability activities). Because the data is submitted voluntarily by farmers' markets, there are large amounts of missing data: 111 farmers' markets did not disclose a certified organic status and 80 farmers' markets did not disclose the categories of products sold. In the Sustainability Index, missing data was not included in the count. Farmers' markets were required to disclose their accepted payment methods as a required field for submitting their farmers' market into the Directory. Therefore, there is no missing data for payment diversity. There is no apparent relationship between the farmers' markets that are missing data and the key independent variable, whether or not a farmers' market is city-run.⁵

The key independent variable in this study is a dummy variable - is a farmers' market run by a city or is it not. This involved looking at every farmers' market webpage and/or Google search results. A farmers' market is classified as city-run if a city staff person is the market manager and/or

⁵ There is a statistically significant relationship between missing data and both the Rural Urban Continuum Code and racial diversity. More urban farmers' markets did not disclose product diversity or organic status. Additionally, farmers' markets in communities that had smaller percentages of white residents did not disclose product diversity or organic status. There is a significant relationship between higher levels of education and missing data for product diversity, but there is no significant relationship between education and missing data for organic status.

key contact person, the farmers' market board meeting minutes are posted on the city's website, and/or there is reference made to the city as the host and operator of the farmers' market on their website.

The demographic independent variables used in the model include a measure of geographic location (i.e. rural, suburban, or urban), age, racial diversity, income, education, and 2016 presidential vote. Geographic location is operationalized using the 2013 Rural Urban Continuum Codes (RUCC) provided by the Economic Research Service (USDA 2018).⁶ Median age, median income, racial diversity (as measured by the percent of white residents), and education level (as measured by the percent of the population over 25 with a bachelor's degree or higher) was collected on the zip code level using 2012 – 2016 American Community Survey 5-Year Estimates.⁷ The 2016 presidential vote is reflected at the county level and operationalized as a dummy variable - Hillary Clinton had the plurality of the vote, or she did not.⁸ Based on existing local government sustainability literature, the following hypotheses reflect the expected relationships between the demographic independent variables and Sustainability Index: older communities, wealthier communities, whiter communities, higher educated communities, communities that voted for Hillary Clinton in the 2016 presidential election, and more urban communities are more apt to

⁶The RUCC is a scale of 1 to 9 with the most urban being a 1. Categories 1 through 3 constitute metro counties and all else is considered non-metro.

⁷There is missing data from the ACS for one zip code which contains two farmers' markets. This information is believed to be unreported because this zip code is made up almost entirely of the University of Minnesota. The ACS provided no explanation as to why this information was missing. However, because this zip code is predominately student residents, it is likely very few report income or the data is believed to be skewed because students report family income as opposed to their own.

⁸This data was collected from the USA Election Atlas at <https://uselectionatlas.org/RESULTS/index.html>

support sustainability initiatives (Saha 2009, Portney and Berry 2010, Opp and Saunders 2012).

H2a: Median age will be positively related to a higher Sustainability Index.

H2b: Median income will be positively related to a higher Sustainability Index.

H2c: Percent white will be positively related to a higher Sustainability Index.

H2d: Rural Urban Continuum Code will be negatively related to a higher Sustainability Index.

H2e: Education level will be positively related to a higher Sustainability Index.

H2f: 2016 presidential vote for Hillary Clinton will be positively related to a higher Sustainability Index.

Findings: The dependent variable, Sustainability Index, is an event count variable necessitating a negative binomial regression to assess the maximum likelihood estimate of a farmers' market's Sustainability Index.⁹ As demonstrated in Table 1, the initial hypothesis (H1) is supported. City-run farmers' markets are more likely to have a higher Sustainability Index. As demonstrated in Table 2, compared to the demographic independent variables, whether or not a farmers' market is city-run is indeed the strongest predictor of a higher Sustainability Index. Furthermore, being city-run is the only predictor of a higher Sustainability Index that is statistically significant at all (at the 99% confidence level with demographic independent variables and at the 99.9% confidence level without). This

⁹For this research a negative binomial regression was more appropriate than a Poisson model to account for any possible contagion effect between farmers' markets adopting sustainability activities of adjacent farmers' markets. Additionally, a negative binomial regression accounts for any potential over or underdispersion. However, both a Poisson and negative binomial regression were run and yielded almost identical results.

disproves the entirety of the demographic indicator hypothesis (H2) and the sub-hypotheses. Not only were sub-hypotheses disproven, the opposite directional relationship was different than the literature would suggest for geographic location, median age, and median income.¹⁰ There was a positive relationship between percent white, 2016 presidential vote for Hillary Clinton, and education.

Table 1: City-Run Farmers' Markets and Sustainability Index

	Sustainability Index
City Run	0.523*** (0.160)
Constant	-0.012 (0.084)
Pseudo R²	0.012
N	191

Note: Cell values are negative binomial coefficients with robust standard errors in parentheses. The DV is a count of sustainability initiatives adopted by farmers' markets (0 = adopted no initiatives to 3 = adopted all three initiatives). *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

¹⁰ All independent variables are scaled from 0 to 1 so that direct comparisons can be made between coefficients.

Table 2: Potential Factors Influencing Sustainability Index

	Sustainability Index
City Run	0.534** (0.169)
RUCC_2013	0.248 (0.343)
Median Age	-0.018 (0.607)
Percent White	0.625 (0.684)
Median Income	-0.363 (0.531)
Education	0.840+ (0.483)
2016 Presidential Vote for Clinton	0.050 (0.254)
Constant	-0.732
Pseudo R ²	0.021
N	189

Note: Cell values are negative binomial coefficients with robust standard errors in parentheses. The DV is a count of sustainability initiatives adopted by farmers' markets (0 = adopted no initiatives to 3 = adopted all three initiatives). +: $p < 0.10$; *: $p < 0.05$; **: $p < 0.01$; ***: $p < 0.001$

RUCC_2013 is a measure of county location from the USDA ERS, scaled from 1 to 9. A code of "1" indicates counties in metro areas of 1 million population or more. A code of "9" indicates a completely rural area with less than 2,500 urban population and not adjacent to a metro area.

Education, as an indicator, approached significance at the 90% confidence level, which led me to further examine the role of nearby college campuses as an indicator for adoption of sustainability initiatives (Lake

2000).¹¹ When accounting for a college campus in the same zip code, education still approached significance at the 90% confidence level, but the presence of a college campus was significant at the 95% confidence level in predicting farmers' markets with a higher Sustainability Index.¹² This relationship between college campus and farmers' markets with a higher Sustainability Index should be examined in the future, both in terms of farmers' markets and the role of a college campus in influencing local government sustainability initiatives.

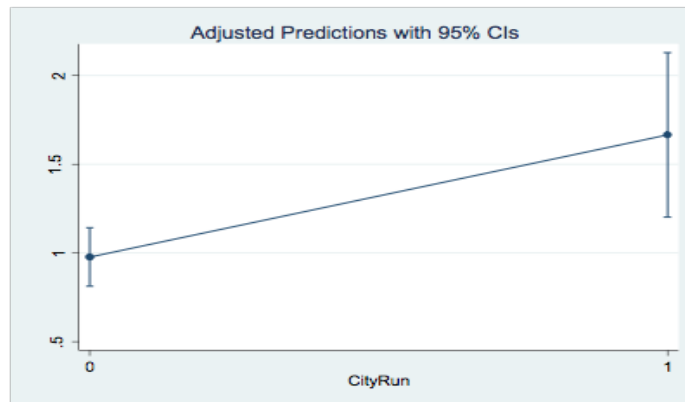


Figure 1. Expected Values for Sustainability by City Run Farmer's Market

¹¹ College campuses included any private, public, or for-profit college or university of any size. For future research, defining a meaningful scope for college campus would be necessary to truly assess role as indicator of Sustainability Index.

¹² The interaction term between city-run farmers' markets and college campuses was not significant, nor was there a strong relationship between city-run farmers' markets and college campuses. In including the interaction term in the full negative binomial regression, it did not have a significant p-value and had a positive coefficient.

In assessing the maximum likelihood of a farmers' market's Sustainability Index based on the operator of the market - holding all demographic indicators at their means - Figure 1 demonstrates a statistically significant difference between the Sustainability Index of farmers' markets that are not city-run (0) and city-run (1). This difference is significant at the 99.9% confidence level.

Limitations: The scope of these findings is limited. The largest dataset available on farmers' markets is from the USDA National Farmers' Market Directory. Farmers' markets' participation in the Directory is voluntary and does not require all fields to be completed before submission. This results in inconsistent reporting and missing data. Additionally, this unique dataset was created to only include Minnesota farmers' markets due to limited time and resources. There is no reason to believe that Minnesota is representative of city-run farmers' markets across the Midwest or the nation. This research also only looks at what is reported; there was no follow-up with market managers to verify each farmers' markets' participation in the activities that constitute the Sustainability Index. In this way, this work is representative of the gaps in other local government sustainability literature in that it "fails to fully explore sustainability as is actually practiced across municipalities" (Saha 2009, 28).

Future Research: The contribution of this study is to begin a discussion on city-run farmers' markets and then to take an inductive approach through both the findings and future qualitative research to dictate why city-run farmers' markets have a greater capacity to apply the Three E's of sustainability. In the future, this research will also need to take a closer look at the Sustainability Index of city-run farmers' markets and the local government structure of the administering city (council-manager, council-mayor, or hybrid cities). In their study, Opp and Saunders (2012) found that local governments with leadership structures including a city council and a city manager score higher on their sustainability index composed of a sustainability initiative taxonomy. The authors believe it to be because council-manager cities have a greater ability to reflect a community-wide

perspective, are more inclusive, and tend to focus more on long-term solutions (Opp and Saunders 2012).

Future research should also include interviews with city-run farmers' market managers as well as other relevant city-level staff. This will better illustrate the intention behind city-run farmers' markets. Are they being used as tools for sustainability, like these findings would suggest? Or are they being administered by cities for other reasons? Likely, there will be a diverse set of intentions behind why cities incorporate farmers' markets as part of their services. Future research should seek patterns to provide explanation of the findings in this study.

Additionally, it is important to further explore the demographic indicator variables and their lack of significance in this study. Although there is no strong consensus within the literature about the factors that indicate whether or not a city is more or less likely to embrace sustainability initiatives, the rejection of the hypotheses related to demographic indicators requires further examination. The rejection of these demographic hypotheses is also important for scholarly literature on farmers' markets more broadly and the communities that support them. Based on the findings of this research, farmers' markets exist in urban and rural communities, rich and poor, racially diverse and majority white. However, the critiques of farmers' markets and the local food movement as an exclusive space that is built on the preferences and values of white, middle to upper class individuals needs to be explored further to assess the role of farmers' markets in communities and their ability to be used as an initiative to address all Three E's of sustainability.

Conclusion

Farmers' markets are unique actors in the local food movement. Their growth in the last two decades is staggering. Farmers' markets attract a unique set of stakeholders: farmers, consumers, local governments, nonprofits, Chambers of Commerce, and advocacy organizations. Often

overlooked in scholarly literature, farmers' markets play an interdisciplinary role in communities - as a marketplace, as a community gathering space, and as a tool for sustainability. The findings of this study indicate that local governments are more successful at using farmers' markets as tools for sustainability compared to farmers' markets administered by nonprofits, volunteers, or other actors. This finding creates a starting point for further examination of this specific use of farmers' markets as a sustainability initiative at the local government level. Almost two decades ago, farmers' market historian Allison Brown wrote, "these are exciting times for students of farmers' markets" (2001, 174). As little scholarly literature has been added in proportion to the meteoric rise of farmers' markets since the mid-1990s, these continue to remain exciting times for students of farmers' markets to explore how a partnership between farmers' markets and local governments are contributing to environmental, economic and equitable sustainable development.

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