

# Farmers Markets in Urban US Counties

The relationship between income, obesity, and access

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## Abstract/Introduction

In the last decade there has been a convergence of factors that have contributed to an increase in food deserts, obesity, and income inequality in the US. Two-thirds of US adults are overweight or obese. This prevalence disproportionately affects low income areas with high minority populations (Ruelas et al., 2012). Simultaneously, research shows that grocery stores are tending to move away from low income, inner city communities and towards affluent urban and suburban areas. In order to combat the growing food deserts and obesity rates as a result of this shift, farmers markets have been proposed and utilized as a means to increasing access to fresh, healthy, nutritious, and affordable food (Jilcott et al., 2011).

The number of farmers markets in the US has increased by 84% in the last decade (Alkon, 2008). With over 8,000 reported farmers markets in the US in 2012, the spatial distribution of farmers markets has power to provide insight into the continuing discussion on food, health, and poverty. This geographic analysis examines the relationship between urban farmers markets, race, income, and obesity rates in the United States. While farmers markets have been offered as a tool for social justice in low income areas, they have likewise been associated with organic, high quality, and sustainable sources of food in higher income areas (Alkon, 2008). Furthermore, farmers markets are perceived as a positive community building platform for urban areas. The purpose of this study is to identify the relationship between income, race, and obesity rates among highly urban areas with a high number of farmers markets.



Figure 1. Reported USDA National Farmers Market locations across the US.

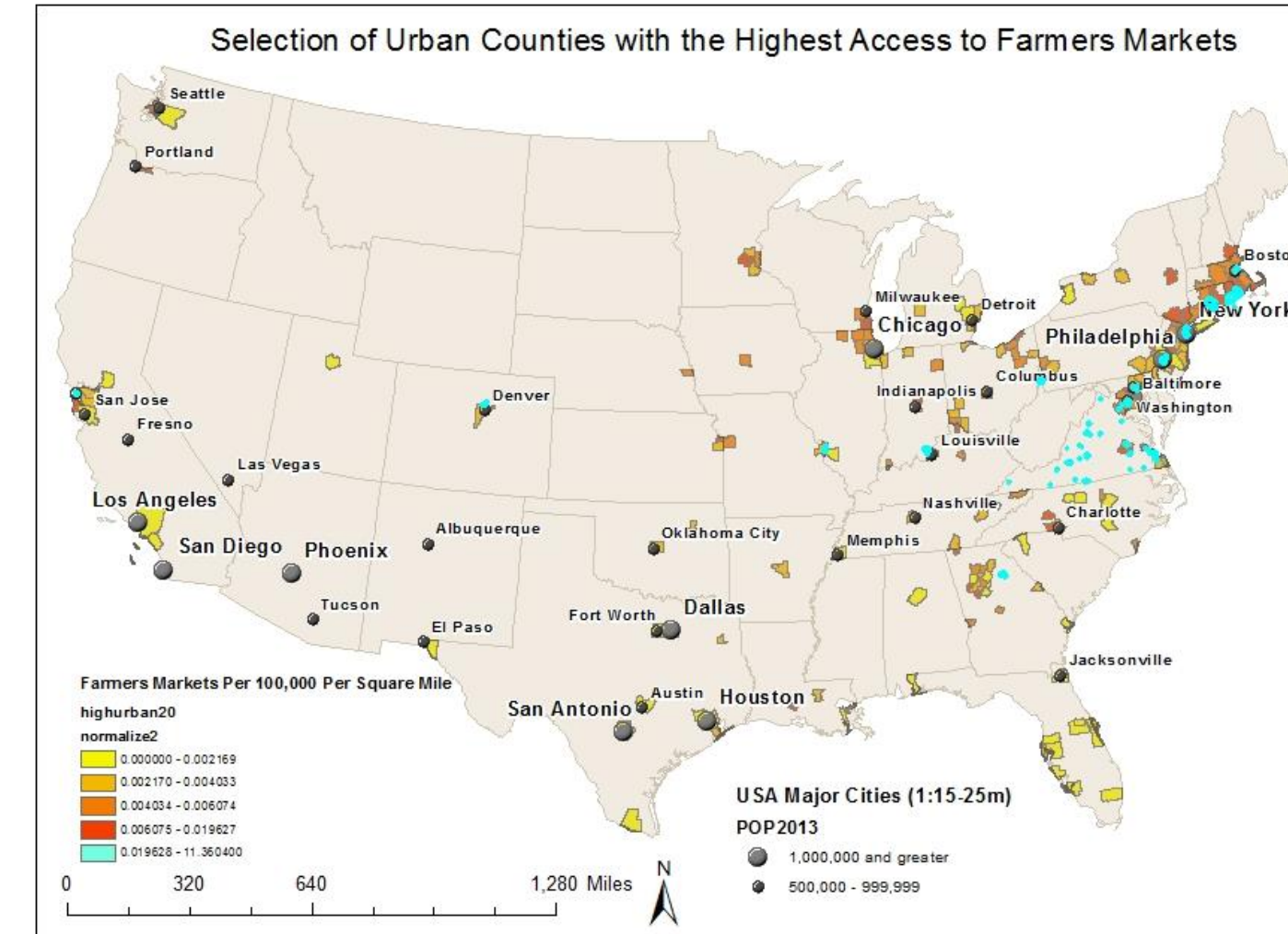


Figure 2. A selection of highly urbanized US counties classified by the number of farmers markets per 100,000 per square mile.

Figure 5. Access to Farmers Markets in High Urban Virginia Counties

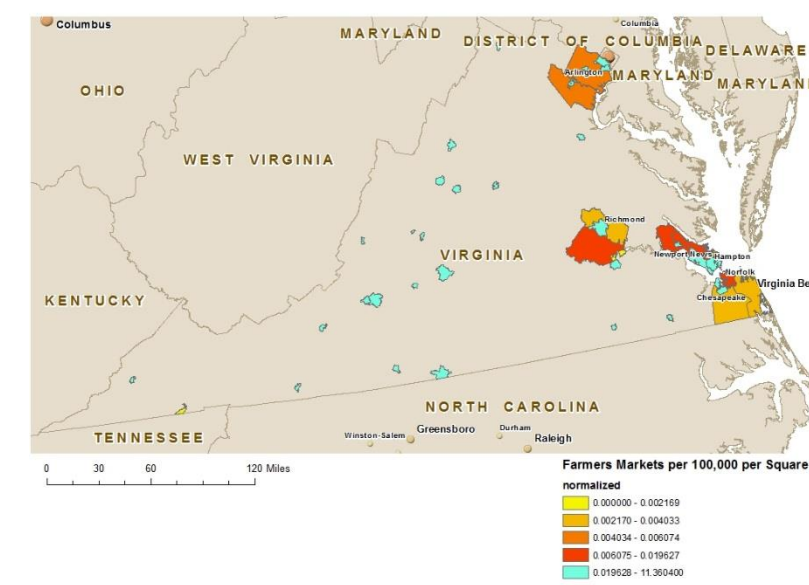


Figure 6. Obesity Prevalence in High Urban Virginia Counties

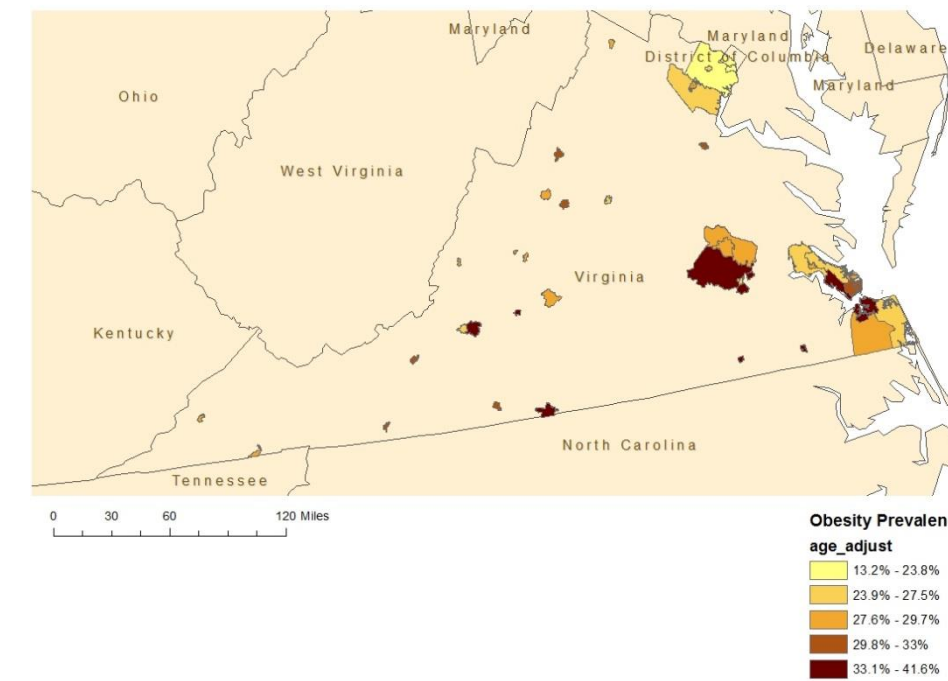


Figure 7. Median Household Income in High Urban Virginia Counties

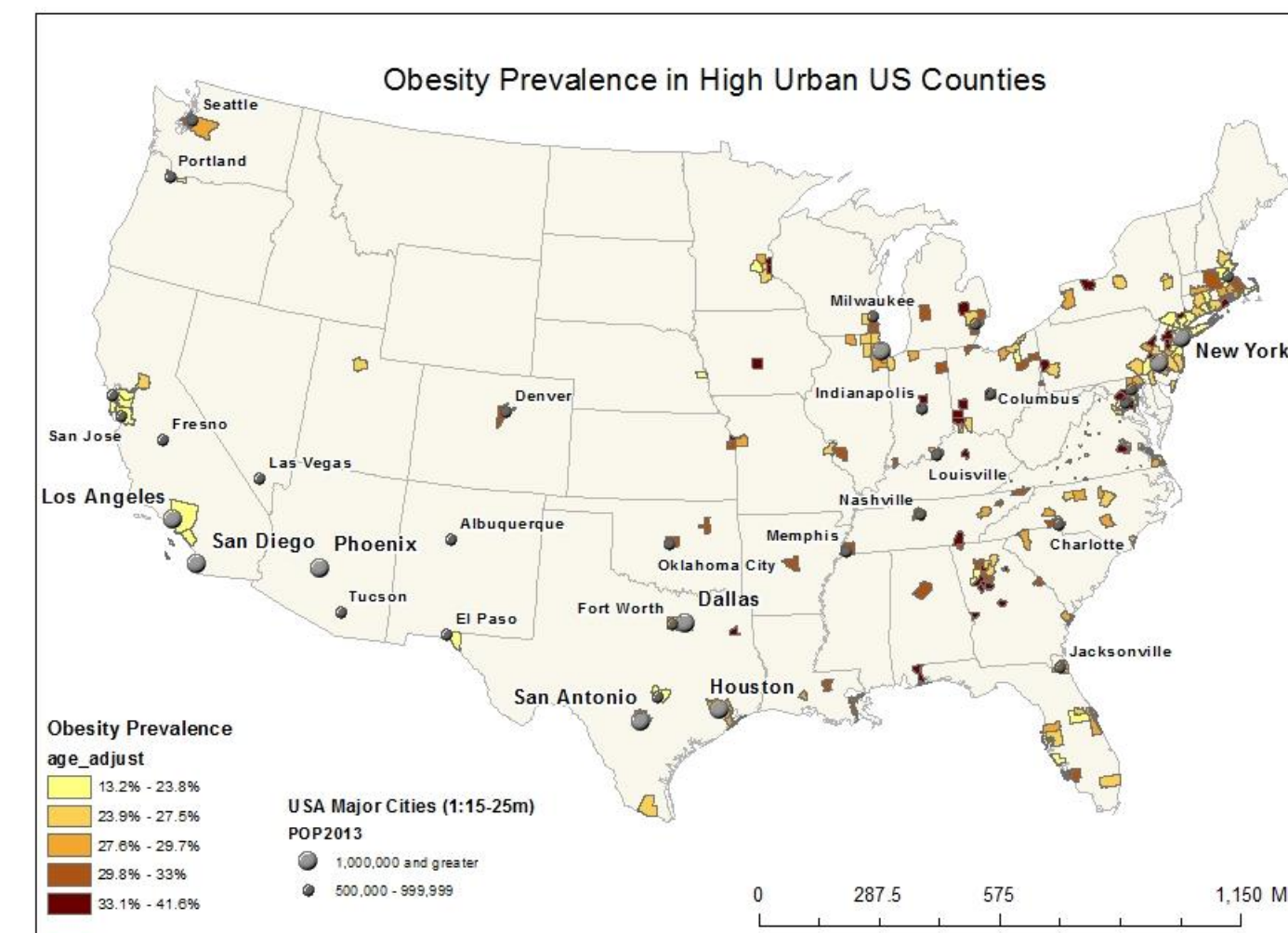
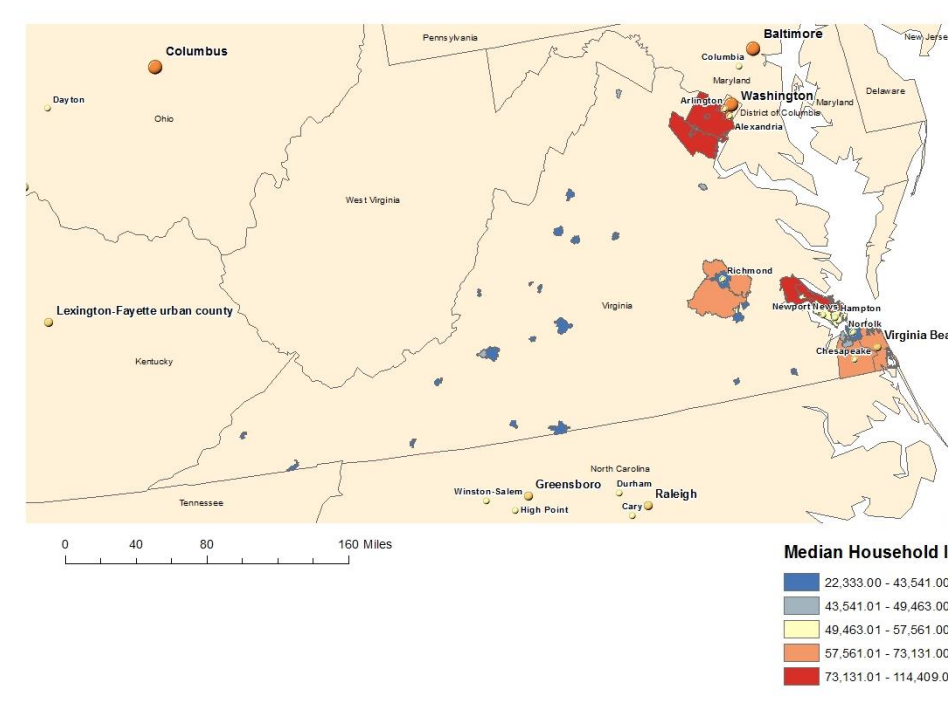


Figure 3. A selection of highly urbanized US counties classified by age adjusted obesity prevalence.

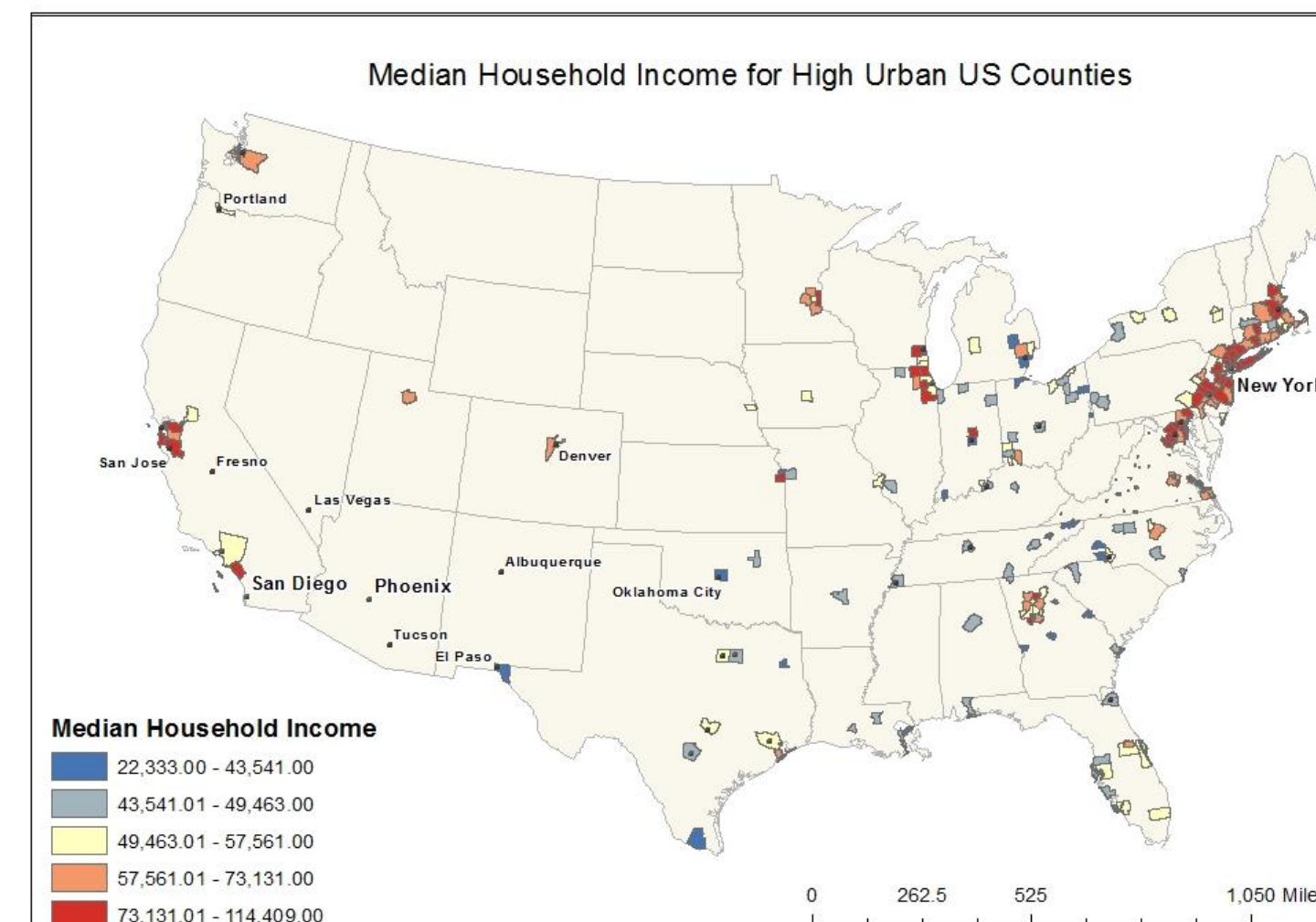


Figure 4. A selection of highly urbanized US counties classified by median household income.

## Results and Discussion

As expected, the results in Figure 2 reflect a selection of the 245 most urbanized counties which naturally tend to fall along the densely populated Eastern coastline. Within the high urban counties, those counties with the highest number of farmers markets per 100,000 per square mile (highlighted in blue) are generally found along the Northeastern coastline and Virginia. Notably, 32 of the 49 urban counties in the top quartile of access to farmers markets are found in Virginia. The highly urbanized counties with greatest access to farmers markets in Virginia are not clustered around a central location, as might be expected. Instead, these Virginia counties appear to be dispersed randomly throughout the state. Other loose clusters of counties with high access to farmers markets can be found in and around New York, Baltimore, Washington, Columbus, and Chicago.

Figure 3 allows us to compare counties' farmers market access with obesity rates. In counties with the highest access to farmers markets, we found that an obesity rate of 27.6% or higher generally persists although there is variation in different parts of the country. For example, counties with high access to farmers markets in California are also characterized by low obesity rates. However, high urban counties in Virginia correlate strongly with high obesity rates (Figure 6).

Figure 4 offers a third layer depicting median household income. Those high urban counties with high access to farmers markets (particularly in the Northeast, California, and Chicago area) are generally associated with a high median household income over \$57,561. It is more difficult to characterize the national relationship between low income areas and access to farmers markets. Lower access to farmers markets appear to correlate with low income areas, particularly in the South and Midwest. However, again there are exceptions in California, for example, where low access to farmers markets correlates with mid-to-high income counties and low obesity rates. Overall, there is a trend across the nation that shows urban counties with high obesity rates also having low or middle median household incomes, as previous literature has suggested (Jilcott et al., 2011). There are also instances of lower obesity rates appearing in mid to high income counties across the U.S. who also show relatively high access to farmers markets. The Chicago area exemplifies this combination of variables.

Virginia offers an interesting case deserving closer analysis. In Virginia, high access counties are spread throughout the state. These counties are generally associated with a low median household income that is less than \$43,541. These counties are also associated with a high obesity prevalence between 29.8% to 41.6%. Alternatively, the urban Virginia counties with low access to farmers markets are also associated with mid to high income. These results are contrary to the prevailing trends found throughout the United States. A preliminary search into the factors that yield these results did not provide a full explanation. However, from the research from this study, we can conclude that Virginia markets are likely being used as a tool for social justice by being placed in low income, high obesity areas.

## Conclusion

In analyzing nationwide trends between income, obesity, and access to farmers markets, it becomes easier to identify those urban areas that may not follow the nationwide trend of low access to farmers markets accompanied by low income and high obesity. As exemplified by Virginia, high access to farmers markets have the potential to permeate low income, high obese areas in an effort to combat social justice issues. If farmers markets can and do offer fresh, healthy, and affordable food to low income areas, then it would be beneficial to counties to welcome farmers markets as an opportunity to build community and decrease obesity in low income areas.

Furthermore, the benefits of farmers markets in high income urban areas have potential to engage consumers with sustainability; this should not be overlooked. As Alkon (2008) finds, farmers markets in affluent neighborhoods serve as a medium to connect a highly consumptive population to nature and wilderness. The urban counties in which there is a high median income, like California and the Chicago area, have great potential to engage a highly consumptive population with sustainability discourse and action. Having identified urban areas in which there is high access or low access to farmers markets, we can now maximize the potential that farmers markets have as tools for engaging communities with sustainability at both ends of the income spectrum.

## Future Research

Future research should focus on the relationship between farmers markets, income, and obesity because this research provides insight towards engaging high income and low income communities with sustainability. Race was not included in this study, but should be included as a future variable for comparison. This study also excluded rural areas, but future research should analyze the relationship of these variables in non-urban counties. Furthermore, future research should find an explanation for such high access to farmers markets in Virginia. If, in fact, farmers markets are able to be used as tools of social justice in low income areas and sustainability in high income areas, then the potential of farmers markets to help the US achieve sustainability goals is relevant. Farmers markets can be used as a tool in low income and high income areas to limit wasteful resource consumption, increase community, lower income disparities, and increase access to healthy, affordable food. Future research should identify potential counties, particularly low income areas, in which farmers markets could connect consumers with local food systems and could be used as impactful tools for sustainability and social justice.

## References/ Data Sources

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## Lit Review

Alkon (2008) analyzes the role of 2 urban farmers markets in San Francisco Bay. He finds that the purpose of farmers markets in a community is connected to the demographics of that population. The author's results show that farmers markets in affluent, white neighborhoods tend to be used by the community as a means to connect urban consumers with an outside wilderness as well as the value of ecological sustainability. In low-income African American neighborhoods, the discourse surrounding farmers markets were more aligned with social justice themes of race and income inequality and less aligned with strict environmental concerns. While both farmers markets do incorporate equity and ecology on some level, the urban social context (race and income) heavily influence how each market operates in a community.

Bader et al. (2010) performed a GIS analysis of farmers markets in New York City. High poverty neighborhoods were found to benefit more from the farmers market locations than low poverty neighborhoods. From this, Bader concludes that farmers markets play a markedly more significant role when placed in high poverty neighborhoods, despite the majority of farmers markets being located in affluent, white neighborhoods. Adjusting for vehicle ownership, the author also found that the locations of fruit, vegetable, and farmers markets increased access to healthy food most in predominantly Hispanic, Asian and immigrant neighborhoods.

Jilcott et al. (2011) studied the relationship between per capita farmers markets, grocery stores/supermarkets, and supercenters and county-level obesity prevalence. The authors found that farmers markets in metropolitan areas were not overwhelmingly related to obesity rates, but farmers markets were inversely related to obesity rates in non-metropolitan counties. The authors identify the use of metropolitan categorization to determine rural/urban status as a limitation of their study. Jilcott et al. encourage future research that focuses on individual-level associations among obesity in urban areas and access to farmers markets.

Using the 2012 USDA National Farmers Market Directory, Cui (2013) validates the spatial accuracy of farmers market locations. The study found that three-fourths of reported farmers market locations by farmers market managers were spatially true. Since the same dataset is also being used in this study, the work by Cui verifies the accuracy of the data set and brings validity to the results.

This study builds upon previous local studies of farmers markets by looking at trends nationally across the most urban U.S. counties.

## Methodology

I collected farmers market data from the USDA National Farmers Market Directory found on Data.gov. I spatially displayed the data within counties to find clusters of farmers markets. I calculated the number of farmers markets per capita, but some counties have a significantly denser population than others. It was necessary to factor in population density as a measure of access. For example, New York counties have a relatively high population density in a small area when compared to the small population dispersed over a large area in Wisconsin. In order to account for population density and county areas across the U.S., it was necessary to normalize the number of farmers markets in each county with these two variables. In order to perform this analysis, census data was obtained from the National Historical Geographic Information System at the Minnesota Population Center. Data were collected at the county level.

Because the US counties are so diverse in population size and area, it was necessary to narrow the analysis to the top 20% most urban counties in order to overcome analytical challenges. Urban areas were defined as continuous census blocks that meet a population density number of 1000/500ppsm and also are adjacent to densely populated census blocks reaching 50,000 people or more. This was applied in the study by calculating the percentage of urban area in each county, sorting the data into bins according to percent urban, and then selecting those counties that fell into the top 20% (also meaning that 20% or more of the county's area was classified as urban). This high urban selection, then, became the basis for the analysis moving forward. The urban selection (and exclusion of rural areas), allows for a more accurate nationwide comparison of counties. From this point on, I will refer to this selection as the high urban counties.

After displaying the normalized farmers market data for high urban counties, income and obesity rates were chosen as variables to aid in the contextualization of the farmers market locations. I joined the tabular income and obesity data sets to the spatial boundaries using the applicable county and state geo id, as well as the county name. Quantile classification was used for income and obesity variables. I represented the data at a nationwide level first, and then chose to narrow the analysis on Virginia where interesting results were found.