Green Thumb or Green Monster? An analysis of the effects of community gardens on gentrification in Boston, MA

Background

After years of disinvestment in a community, white flight, and racist planning practices, some cities across the United States have been left with a series of vacant lots (Haines, 2010). Some community members have taken matters into their own hands and transformed these lots into community gardens as a way to promote wellness by increasing residents access to fruits and vegetables. Since access to green space has been shown to increase health (Black, 2016), transforming 'unused' space into gardens may seem like a win-win, but this rebranding may bring in new demographics that limit the opportunities for the people already living there.

Improving communities in this way has been associated with future gentrification of an area (Maantay & Maroko, 2018). Gentrification does not have one definition, but it is the process of a changing neighborhood characterized by factors such as increase in rents, change in demographics, and changes in land use (Zuk & Chapple, 2015). Gardens may make low income neighborhoods appealing to outsiders, thus pushing out those that have already been living there. The purpose of this analysis is to see if community gardens increase gentrification and change the demographics of a neighborhood.

Data

Census tract demographic information for Suffolk county (Boston, MA) was obtained from the American Community Survey for both 2013 and 2017 through the US Census FactFinder. Data tables were obtained for three categories related to gentrification: race, per capita income, and education attainment (Zuk & Chapple, 2015). A TIGER/Line shapefile was obtained from the US Census website for the state of Massachusetts. Community garden locations were obtained from bostonnatural.org as a KML.

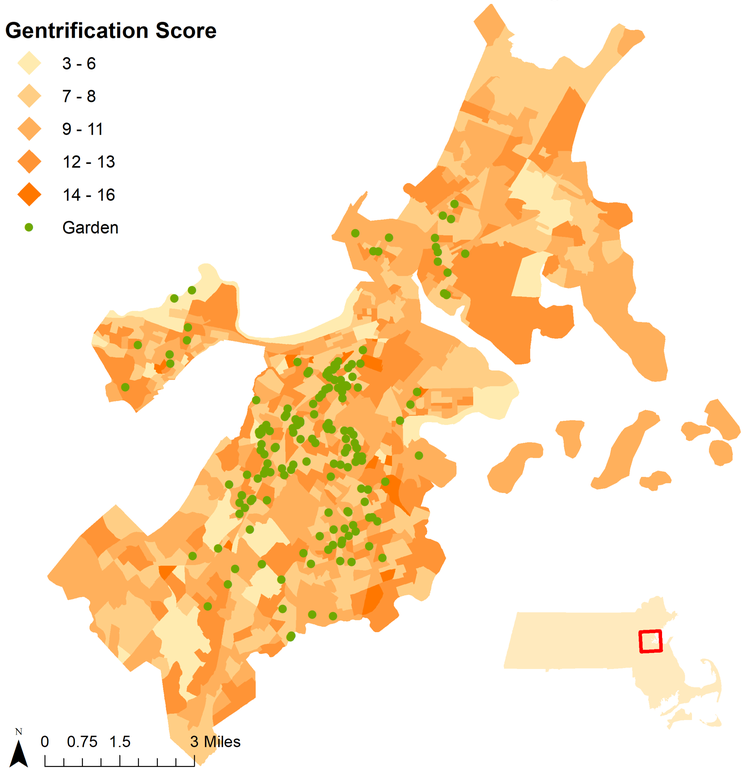


Figure 5. Census tracts with assigned gentrification scores mapped with the location of gardens.

Methods

To understand where gentrification was happening, a vulnerability score was created based on three categories: race, per capita income, and education attainment. To start, race categories were aggregated to 'white' and 'non-white,' and the percent change in white residents was calculated for the 5-year period. The process was repeated for education attainment, where categories were aggregated into 'below bachelor's level attainment' and 'bachelors or above.' Lastly, per capita income was calculated for the percent change in dollars over the period.

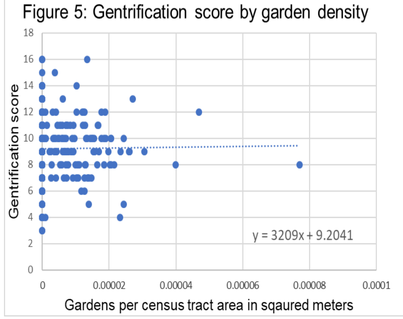
These tables were brought into ArcMap, and joined with the TIGER/Line shapefile for the state by Geo.ID codes. As seen in Figure 1, 2, and 3, each category was mapped for percent changes over the five-year period. The percentage data for each category were divided into 6 classes, and breaks were created manually and done to evenly disperse data, but also to not have zero be in the middle of a group. Each census tract was assigned a score from 1-6 for each category, with 1 meaning the least change towards gentrification, and 6 the most change towards gentrification for that category. The information was aggregated for all three scores to create a score of 3-18 for each census tract, which is presented in Figure 4 alongside the locations of the community gardens. The community garden locations were transformed from KML to a shapefile in ArcMap.

The number of community gardens in each census tract were counted and then divided by the area to find the density of gardens per census tract, which was transferred into Excel along with the tracts gentrification score, which was used to create a scatter plot of score by density. A line of best was found to determine the relationship between garden location and increase in gentrification.

Results

As seen in the final map, Figure 4, we can see the locations of gardens and the gentrification score mapped where darker areas represent the most gentrification and lighter areas represent the least amount. Figure 5 is a scatter plot output when the gentrification score was plotted by census tract garden density. A line of best fit was added to show the relationship between the two. As density increases, there is a slight increase in gentrification score, which suggests there is a correlation between community gardens and gentrification.

Figure 5: Gentrification score by garden density



Conclusions

There is a slight association with community gardens and gentrification. These findings are consistent with other findings, but not at such an extreme impact as seen previously. Many of the gardens were clustered in census tracts that had low gentrification scores, but also some tracts with high gentrification scores were surrounded by community gardens just outside the tract. It is possible that there was a larger effect of gardens and gentrification, but the impact was diminished by the separation of political boundaries. This analysis did not include rent changes, which could be added to future analyses. The time period of 5-years may also not have been enough time to see meaningful change. As Boston continues its plan to expand community gardens, this analysis can be used to remind planners to critically think before making decisions.

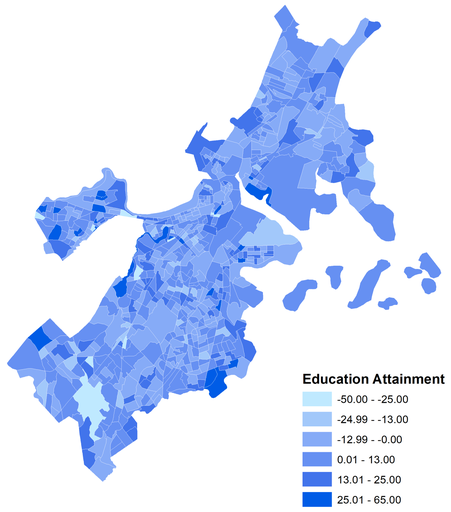


Figure 1:
Changes in education attainment.
Percentage point increases in number of people holding a bachelor's degree or above from 2013 to 2017. The darkest blue areas represent the highest change in number of residents holding either a bachelor's, master's or professional degree. The lightest blue areas represent a decrease in the percent of the population with above a bachelor's education.

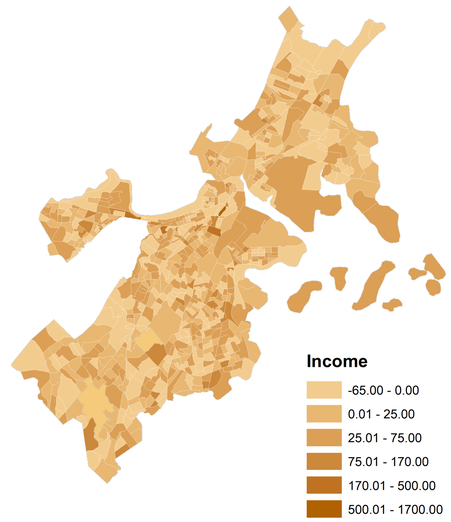


Figure 2:
Changes in income.
Percentage point increases in per capita income from 2013 to 2017. The darkest brown areas represent the highest change in per capita income in a census tact. The lightest brown areas represent a decrease in per capita income in the census tract for the 5-year period.

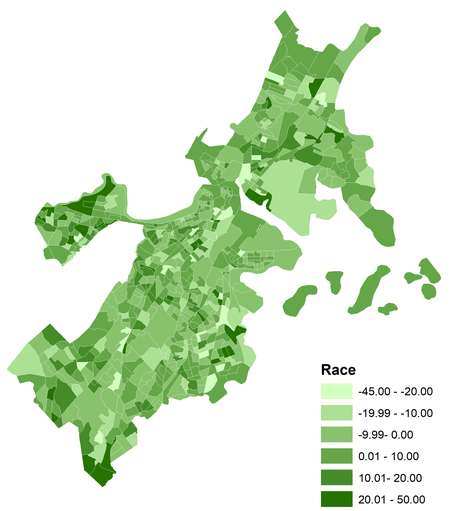


Figure 3:
Changes in race demographics.
Percentage point increases in number of people identifying as white from 2013 to 2017. The darkest green areas represent the highest increase in the number of white residents in a census tract. The lightest green areas represent an increase in the number of non-white residents living in the census tract.

Tufts University | Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy

Cartographer: Maya Zamek | NUTR 231: Fundamentals of GIS | December 12, 2019
Created using ArcMap 10.6.1 | Projection: Transverse Mercator | NAD 1983 UTM Zone 18N
Data sources: US Census, ACS Survey 2013 and 2017, Boston Natural

References
Black, C. (2016). Urban green spaces. World Health Organization. Retrieved December 6, 2019, from http://www.who.int/sustainable-development/cities/health-risks/urban-green-space/en/
Haines, L. (2010). White Flight and Urban Decay in Southern Chicago. Retrieved December 6, 2019, from http://digitalcommons.iwu.edu/cgi/viewcontent.cgi?referer=www.google.com.br/&httpsredir=1&article=1112&context=econ_honproj
Maantay, J. A., & Maroko, A. R. (2018). Brownfields to Greenfields: Environmental Justice Versus Environmental Gentrification. International journal of environmental research and public health, 15(10), 2233. Multidisciplinary Digital Publishing Institute.
Zuk, M., & Chapple, K. (2015). Gentrification Explained | Urban Displacement Project. Retrieved December 6, 2019, from https://www.urbandisplacement.org/gentrification-explained