Distribution of Farmers' Markets Accepting SNAP in Maine

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Introduction

According to the USDA 16% of Maine's residents faced food insecurity in 2014, and the state has seen a 6.4% increase in food insecurity since 2004 (Coleman-Jensen et al. 2014). One of the major food supplement (FS) programs to assist food insecure individuals is SNAP (Supplemental Nutrition Assistance Program). SNAP provides monthly food assistance to individuals based on their income, assets and expenses. The national average benefit is $125 per person per month. Food insecure individuals are often unable to purchase fresh and organic produce given its relatively high cost.

Maine's SNAP farmers' market program allows low-income families to use their EBT (Electronic Benefits Transfer) cards to pay for fresh produce at select farmers' markets, often at a discounted rate. However, currently only about 30% of farmers' markets in Maine accommodate SNAP. It is unclear whether these SNAP farmers' markets are distributed in the areas that need them most.

In this study I examine the distribution of farmers' markets that currently accept SNAP/EBT cards and compare them to a). the number of individuals in the town which received food supplements in 2015. b). the town's population as of 2010 and c). the percentage of the town's population which receives food supplements. Based on this analysis I hope to identify some factors which influence the distribution of SNAP farmers' markets, and identify areas that would benefit most from the SNAP program.

Methods

I obtained address data for farmers' markets in Maine from www.getrealmaine.com and performed the spatial analysis using ArcMap 10.3.1. I entered the addresses into Google Earth and exported them as a KML file to ArcGIS, where I converted them to a layer. I coded each farmers' market with a 1 if they accept SNAP/EBT cards and a 0 if they do not, which allowed me to display the spatial distribution of SNAP farmers' markets.

Population and food supplement data was available on the Maine Department of Human Health website. I downloaded a shapefile of Maine towns from the Maine Department of GIS. By joining population and food supplement data with this shapefile I was able to represent the number of individuals receiving food supplements, population, and the percentage of the population receiving food supplements for each town.

Data was projected using a transverse Mercator projection and layers are in UTM zone 19 N. I used R to run statistical tests and create graphs. For each of the three factors considered (1. The number of individuals per town receiving food supplements, 2. the population of the town, and 3. the percentage of the town receiving food supplements) an ANOVA was run to analyze whether there was a statistically significant difference between towns which have no farmers' market, a farmers' market which does not accept SNAP and a farmers' market which accepts SNAP. A pairwise t-test identified between which factors there were significant differences.

Box 1: Number of Individuals on Food Supplements

Map 1: Distribution of Farmers' Markets and the Number of Individuals on FS per Town
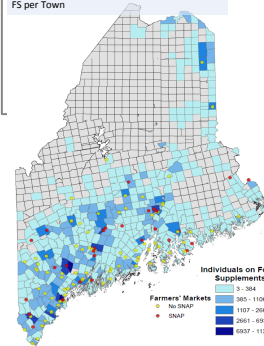
An ANOVA revealed that there is a statistically significant difference between the number of individuals receiving food supplements in a town that a). Has no farmers' market, b). Has a market that does not accept SNAP or c). Has a market that accepts SNAP (p=2.2*10^-16). A t-test revealed that the number of individuals receiving ... across ...
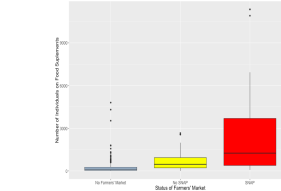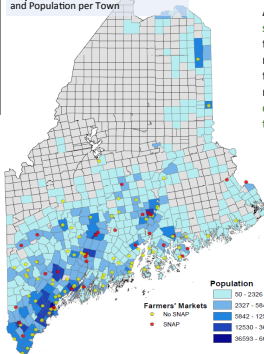
Individuals on Food Supplements
- 3 - 384
- 385 - 1106
- 1107 - 2660
- 2661 - 6936
- 6937 - 11336

Farmers' Markets
- No SNAP
- SNAP

Figure 1: Boxplot of # of individuals per town receiving FS as a function of type of type of Farmers' Market

Box 2: Town Population (2010)

Map 2: Distribution of Farmers' Markets and Population per Town

An ANOVA revealed that there is a statistically significant difference between the population of towns with no farmers' market, towns with a market that accepts SNAP and towns with markets that do not accept SNAP (p=2.2*10^-16). A t-test revealed that there are statistically significant differences between each of the three groups tested.

Population
- 50 - 2326
- 2327 - 5841
- 5842 - 12529
- 12530 - 36592
- 36593 - 66194

Farmers' Markets
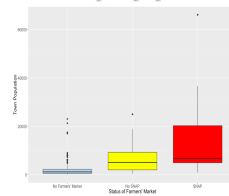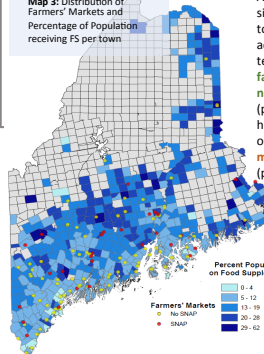- No SNAP
- SNAP

Figure 2: Boxplot of town population as a function of type of Farmers' Market

Box 3: Percentage of Town's Population on Food Supplements

Map 3: Distribution of Farmers' Markets and Percentage of Population receiving FS per town

According to an ANOVA there is not a statistically significant difference between the percentage of towns' populations receiving food supplements across the three categories (p=0.345). However, a t-test revealed that the percentage of a town with no farmers' market and a farmers' market that does not accept SNAP were significantly different (p=4.0*10^-5). There was no significant difference, however, between the percentage of the population on food supplements in a town with no farmers' market and a town that accepts SNAP (p=0.26).

Percent Population on Food Supplements
- 0 - 4
- 5 - 12
- 13 - 19
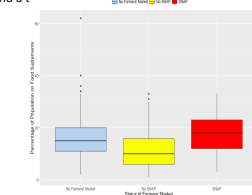- 20 - 28
- 29 - 62

Farmers' Markets
- No SNAP
- SNAP

Figure 3: A boxplot of the percentage of a town receiving FS as a function of type of farmers' market

Results and Discussion

There were significant differences in the number of individuals receiving food supplements as well as the population per town across all three groups (Box 1 and 2). The median number of individuals receiving food supplements is roughly 1,200 in towns that have a SNAP farmers' market, whereas in towns where the farmers' market does not accept SNAP the median number of individuals receiving FS is 450 (Table 1). This suggests that SNAP farmers' markets are well distributed in areas that have a large number of food insecure individuals.

A similar trend can be seen when we look at town populations. The median population of a town with a SNAP farmers' market is more than 1,000 people larger than that of a town with a no-SNAP farmers' market (Table 1). This trend implies that SNAP is more likely to be implemented in the farmers' markets of larger towns. This could be a factor of higher demand in these areas and the set up costs associated with installing the necessary technology to process EBT cards.

The trend between the percentage of a town's population receiving food supplements and the type of farmers' market present is less straight forward. The median percentage for towns without a farmers' market and for towns with a SNAP farmers' market were not significantly different (Box 3). However, both of these categories were significantly different from the median percentage for towns with a no-SNAP farmers' market.

When we look at the combined trend of these three factors, it seems that in general large towns and cities with high numbers of food supplement cases are well represented by the SNAP program. However, smaller towns where a relatively high percentage of the town receives food supplements are under-represented by the SNAP program, and most frequently have no farmers' market at all. These seem to be rural communities in northern and central Maine (Map 2 and 3). These communities could benefit hugely from SNAP farmers' markets as they would provide consistent and affordable access to fresh produce.

Something to consider for future studies is the accessibility of markets, given that small rural areas are the most in need of the SNAP farmers' market program. These towns tend to be widely spread. Therefore it is important that markets are placed in areas easily accessible to low income individuals and families, and where possible along public transport lines. A GIS analysis of least-cost path could be useful in determining optimal placement of future farmers' markets.

Table 1: Median Values of Study Factors Across Categories			
	# Individuals on FS	Town Population	% of Town's Population on FS
No Market	130	1,120	15
No SNAP	470	5,075	10
SNAP	1250	6,670	18

Sources and Acknowledgements

Coleman-Jensen, A., Rabbitt, M., Gregory, C., Singh, A. 2015. *Household food insecurity in the United States in 2014*, ERR-194, U.S. Department of Agriculture, Economic Research Service.
www.getrealmaine.com
www.mainefarmersmarkets.org
The Maine Department of GIS
The Maine Department of Human Health and Human Services