Veggies on the way home
A model for siting a new farmers’ market in Somerville, Massachusetts

Background

Recent research (Khan et al. 2009) and a USDA report (2010) identified farmers’ markets as one tool to increase access to healthy foods for communities because of their flexibility to fit in where needed. Data collected by the Massachusetts Department of Agricultural Resources shows four farmers’ markets within Somerville, Massachusetts city limits.

Farms’ markets supply fresh fruits and vegetables to people in urban areas, who need better access to healthy foods. People are more likely to visit markets which are convenient for them, either because they live or work nearby. People only want to walk so far to reach a market and to carry their purchases home. For this project, a comfortable walking distance is assumed to be around 500 meters. Farmers’ markets may also compete with each other for customers, so markets should be located far apart to both give access to a new part of the community and prevent undue competition.

This model calculates a theoretical site suitability score by calculating suitability in four subcategories: proximity to other markets, the number of people living within 500 meters, the number of people working within 500 meters, and current land use designation.

Methods

Market competition is modeled with a raster of distance from the nearest existing market. Population who would gain access is modeled by both estimates of residential population density by blocks and workplace population density by block groups. The American Community Survey (ACS) workplace population data lacks some granularity but does provide important information about a group of people who would realistically shop at farmers’ markets. Additionally, land use is an important consideration for where a market would have enough space to set up once or more per week. Each subcategory was assigned a score as follows:

<table>
<thead>
<tr>
<th>Subscore</th>
<th>Neutral</th>
<th>Good</th>
<th>Better</th>
<th>Best</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from nearest market</td>
<td>200-500</td>
<td>500-700</td>
<td>700-900</td>
<td>&gt;900</td>
</tr>
<tr>
<td>Residential population</td>
<td>0-3000</td>
<td>3000-7000</td>
<td>7000-12000</td>
<td>&gt;12000</td>
</tr>
<tr>
<td>Worker population</td>
<td>0-2000</td>
<td>2000-4000</td>
<td>4000-6000</td>
<td>&gt;6000</td>
</tr>
<tr>
<td>Land use designation</td>
<td>Commercial</td>
<td>Open land, participation recreation</td>
<td>Sports recreation (stadiums, etc.)</td>
<td>Urban open recreation</td>
</tr>
</tbody>
</table>

These subscores were combined, with the workplace and residential population density scores added together and weighted half each compared to the other parameters, in order to produce a final score.

All maps use a State Plane Massachusetts Mainland FIPS 2001 projection.

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Conclusions

This model produces a number of potential sites within Somerville, and this analysis should only be the start of assessing locations for a new market.

The ACS workplace data is at the block group level, which makes a raster based on it less reliable. It also has margins of error that are often a third to half as large as the estimate itself, indicating less reliability.

This model may be optimistic since it assumes that all of the spaces in the land use categories above are still classified as such over 15 years later and could be convinced to allow a market to set up once or more a week.

For example, I chose to compare the suitability of two locations at Foss Park and Somerville High School for a new market. Though the score of SHS is higher, the space likely has a very limited number of days that it could be used for a market, if at all.

However, the model predicts good success for 3 out of 4 existing markets, which may help validate it to some degree. The Assembly Row market has extremely low populations around it, which this model predicts would be bad for business.

Sources:
http://www.flickr.com/photos/90656797@N07/14771028302/
http://commons.wikimedia.org/wiki/File:Copley_Square_Farmer%27s_Market.jpg