SPECIAL REPORT

The Need for More Supermarkets in New York







FOOD FOR EVERY CHILD

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EXECUTIVE SUMMARY

New York City must address the significant and growing need for supermarkets and food resources in its neighborhoods. Food retailers and public sector development agencies have, in essence, redlined lower-income communities, failing to aggressively combat the factors that have led supermarkets to disinvest from these neighborhoods. The Food Trust researched and wrote "Food for Every Child" to ensure that all children live in communities that have access to safe, healthy and affordable food. A key goal of this initiative is to stimulate the development of supermarkets in lower-income neighborhoods.

New York City is not exceptional in terms of the characteristics or poverty status of its residents when compared to other large urban areas, yet despite a growing population, there are one-third fewer supermarkets in New York's five boroughs today than there were six years ago. There is a pressing need for more affordable, nutritious food in many neighborhoods. When compared to the national number of supermarkets per capita, New York City has 137 too few supermarkets.²

Large areas of New York City have few supermarkets, and in many neighborhoods, none exist. This uneven distribution of food in New York City disproportionately affects large numbers of low-income people. In a nationwide study of 21 metropolitan areas analyzed by zip code, the number of supermarkets in the lowest-income neighborhoods was almost 30 percent less than the number in the highest-income neighborhoods.³

In lower-income neighborhoods, the lack of a supermarket negatively impacts people's ability to obtain a nutritionally adequate diet. At the same time, the incidence of diabetes is disproportionately high in lower-income neighborhoods. Increasing the availability of nutritious and affordable food in neighborhoods with high rates of diabetes does not guarantee a reduction in the incidence of this disease. However, by removing this as a barrier to healthy eating, we can better focus on helping people improve their diets and health.

The public sector has a responsibility to provide a safe and stable food supply in underserved communities. As supermarkets replaced public markets, the public sector largely withdrew from food retailing. Supermarkets later withdrew from many communities, leaving many neighborhoods and large numbers of people without a stable food supply. At the same time, the incidence of diabetes and diet-related diseases increased in these neighborhoods.

Through mapping, this study shows that many neighborhoods in New York City with poor supermarket access also have a high incidence of diabetes-related deaths. The location of supermarkets—access to supermarkets—is a key factor contributing to the health and development of neighborhoods.

This study builds on the excellent work undertaken in the past several years by a variety of government, private and civic leaders in New York City and the State of New York. The Food Trust is committed to building on this work, and working with these leaders to address the problem and improve supermarket access for residents of New York City and State.

We call upon the City and State governments to take the lead in developing a public-private response to this problem. While not a situation of any one sector's making, it is in the interest of the entire community to solve this problem. Solutions that have proven helpful elsewhere in the country include:

- Convening leaders from the business, government, public health, civic and community sectors to develop a strategy to establish more supermarkets in lower- and moderate-income communities.
- Strategic investments with public funds to reduce the risks associated with the development of more supermarkets in lower- and moderate-income communities.

¹ Shulman, Robin (2008). Groceries Grow Elusive For Many in New York City. Washington Post, February 2008.

² National supermarket estimates based on data from the Food Marketing Institute (www.fmi.org) and U.S. Census Bureau (www.census.gov)

³ Zy Weinberg (1995). No Place to Shop: The Lack of Supermarkets in Low-Income Neighborhoods. Public Voice for Food and Health Policy, May 1995.



Introduction

New York City is not exceptional in terms of the characteristics or poverty status of its residents when compared with other large urban areas, yet New York City has fewer supermarkets per resident than many of the nation's largest metropolitan areas. This shortage of supermarkets means that lower-income residents must travel out of their neighborhoods to purchase food, or shop at more expensive corner and convenience stores with less selection and often poor quality food. The insufficient access to affordable and nutritious food in lower-income neighborhoods reduces the purchasing power of neighborhood residents, and may exacerbate long-term health problems resulting from nutritionally inadequate diets.

Low-income New York City residents are likely to suffer from health problems such as diabetes at rates significantly higher than those of the population as a whole. Diabetes rates in New York City have doubled in the past ten years.⁵ For children, diabetes has reached epidemic proportions; at least one-third of five year olds will develop diabetes in their lifetime.⁶

Many low-income families in New York City have limited funds with which to purchase nutritionally adequate foods. Additionally, recent increases in the cost of food place further strain on these limited resources. These families are also likely to have few to no places in their communities in which to shop for reasonably priced foods.

The region's supermarket deficit could be eased and diet related health problems decreased through a highly visible initiative to build more supermarkets in lower-income neighborhoods, and improve the health and nutrition of the children who live here.

The Food Trust has launched "Food for Every Child," to ensure all children live in communities that have access to safe, nutritious and affordable food. This initiative is designed, in part, to stimulate the construction of supermarkets in lower-income neighborhoods. As part of that, this study outlines the extent and implications of the supermarket shortage, identifying the gaps in food availability and the relationship between diet-related diseases and lower-income neighborhoods.

Methodology

To demonstrate which neighborhoods lack supermarkets, a geographical representation of food access, income and diabetes was created by mapping the locations of supermarket sales, income and diabetes mortality data (see Appendix for more detail). Retail sales data for supermarkets were obtained from Trade Dimensions, and reviewed with the New York City Department of City Planning. Diabetes mortality rates were provided by the New York City Department of Public Health and 2006 demographic projection data were derived from the 2000 U.S. Census.

A series of maps was created using Geographic Information Systems computer mapping software.⁸ Weekly sales volume at supermarkets was distributed over a mile radius to plot the concentration of sales, then divided by the density of total population and divided by \$15.24 (the citywide ratio of sales to population) to calculate a ratio for weekly supermarket sales per person. The ratios were mapped; ratios greater than 1 represent high sales and ratios less than 1 represent low sales. Median household income was multiplied by the number of households to determine total income density.

A total of 1,729 diabetes-related deaths were mapped. "High" diabetes-related mortality areas are defined as having ratios greater than the citywide rate, and "low" areas have ratios less than the citywide rate. Only data for New York City were analyzed, so the maps do not show ratios outside of the city.

⁴ Trade Dimensions International, Inc. (2004). 2005 Marketing Guidebook. Wilton, CT; US Census Bureau (2000). Census 2000. Retrieved from http://www.census.gov/main/www/cen2000.html

⁵ New York City Department of Health and Mental Hygiene (2007). More Than 100,000 New Yorkers Face Complications Due to Seriously Out of Control Diabetes. Retrieved from http://www.nyc.gov/html/doh/html/pr2007/pr002-07.shtml

⁶ Narayan, et al., Lifetime risk of diabetes in the United States. JAMA. 2003; 290:1884-1890.

⁷ In the analysis, TradeDimension data for supermarkets and grocery stores with sales above \$2 million or recognized in coordination with the New York City Planning Commission as a store that sells a wide range of products, including fruits and vegetables.

⁸ All data was prepared in MS Excel and mapped in ArcGIS 9.2 with Spatial Analyst extension. Also used were ET GeoWizards v9.5.1 for ArcGIS 9.x and Hawth's Analysis Tools v3.26. Cell size of 1/40 mile, or 132 feet, was used for all raster datasets. The Analysis mask used for all rasters was the City of New York City boundary. The coordinate system and projection used during mapping and analysis were North American Datum 198.

Key Findings

Access to food is not evenly distributed in New York. Many people have to travel excessive distances to buy food at a supermarket.

The uneven distribution of supermarkets is a serious problem in New York City. There are large areas of the city with few supermarkets, and many neighborhoods where none exist.

Map 1: Weekly Sales Volume for Supermarkets, shows the location of 798 stores throughout New York City, and the weekly sales volume for each store. The smaller red circles represent lower weekly sales volume; the larger red circles represent higher weekly sales volume.

Supermarket sales in New York City are concentrated, instead of being dispersed throughout the city in relation to the population. This indicates that many people are traveling considerable distances to buy food at supermarkets in the few neighborhoods where supermarkets are easily accessible. The gray shading shows how supermarket sales are distributed across the city. The darkest areas represent areas where the highest supermarket sales are concentrated. Union Square, Greenwich and West Village, and Midtown South, all in lower Manhattan, have the highest concentrations of supermarket sales in the city, with the Upper East Side and the Columbus Circle area exhibiting dense sales volumes as well. The light areas are where sales are lowest, indicating that there are fewer or no supermarkets located there. In contrast to most of Manhattan, large portions of Brooklyn, the Bronx, and Queens contain low concentrations of supermarket sales.

Map 2: Supermarket Sales and Total Population, shows that the location of supermarket sales does not appear to be associated with total population. The map plots the density of supermarket

sales by the density of population. Communities with greater than average per capita supermarket sales are shown in yellow and brown tones. In these communities, people are either spending more than average in supermarkets, as might be the case in higher-income communities, or more people are buying food in these communities than the number of people who live there, indicating that people are traveling from outside the area to shop there.

MAP 1

Weekly Sales Volume for Supermarkets

Supermarkets by Weekly Sales Volume

- \$39,000 \$557,000
- \$557,000 \$1,075,000

Weekly Sales Volume for Supermarkets

\$0 - \$900,000/sq.mile

\$900,001 - \$1,800,000/sq.mile

\$1,800,001 - \$2,700,000/sq.mile

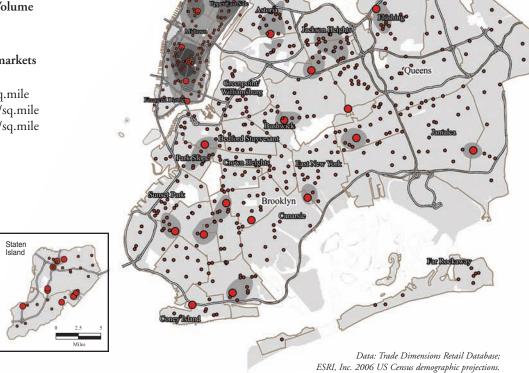
\$2,700,001 - \$3,600,000/sq.mile

Community Districts

Non-residential

Limited Access Highways







The uneven distribution of food in New York disproportionately affects large numbers of low-income people.

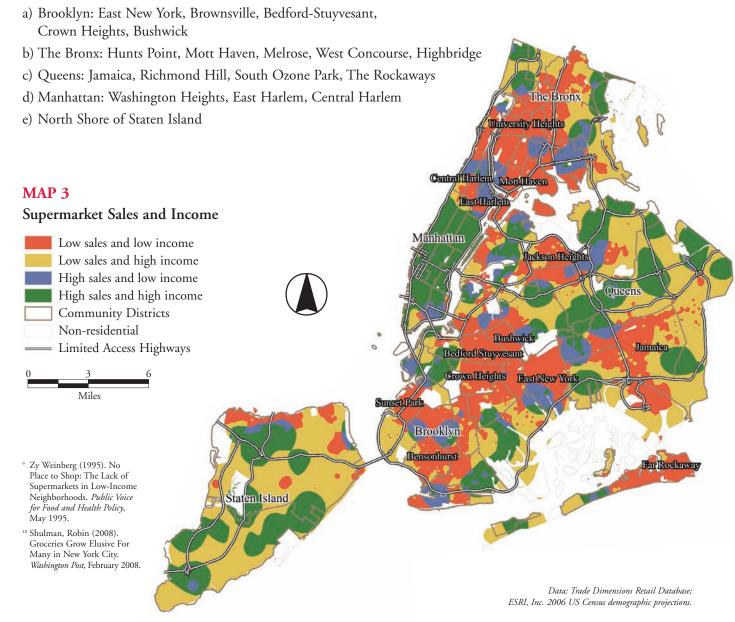
A nationwide study of 21 metropolitan areas calculated the number of supermarkets per 10,000 residents in every zip code. The study found that the number of supermarkets in the lowest-income neighborhoods was almost 30 percent less than the number in the highest-income neighborhoods. In New York City, the number of supermarkets has declined by one third in the past six years. 10

Map 3: Supermarket Sales and Income, shows the distribution of supermarket sales and the distribution of income throughout the city. People in the areas shown in yellow have fewer supermarkets to shop at in their community. However, these communities are higher-income where residents can afford to drive to stores, shop at small specialty and fresh food purveyors, or rely on grocery delivery services.

Higher-income areas with higher supermarket sales have the best access to food resources and are indicated by the green areas of the map. In some lower-income areas, there are supermarkets with higher than average supermarket sales volumes, as highlighted in blue.

The red areas represent neighborhoods that are not adequately served by supermarkets.

Highlighted in Map 4, Low Supermarket Sales and Low Income, are areas with low supermarket sales because there are few to no supermarkets. Income is also lower in these areas, indicating that people living there are less able to afford to travel to the areas where supermarkets are concentrated. This map, then, identifies those areas where people have low incomes and insufficient access to a supermarket, including:





There is a connection between diabetes and lack of supermarket access.

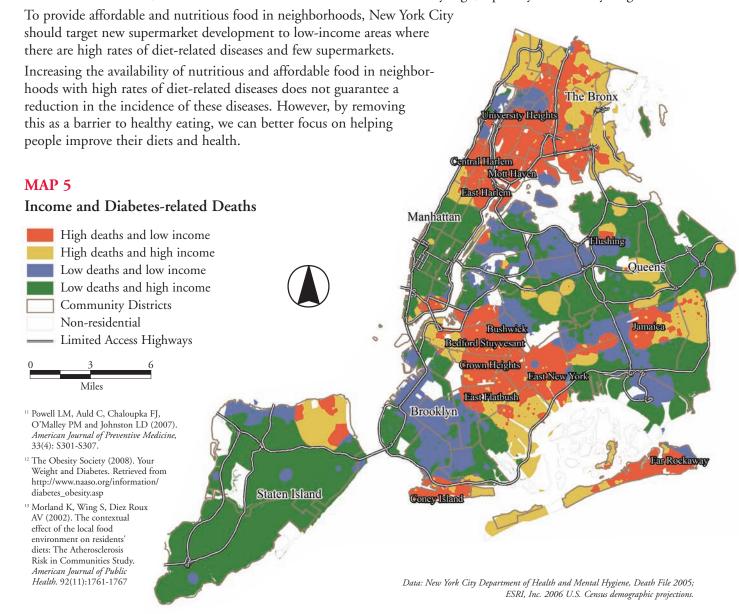
Emerging research demonstrates a relationship between supermarkets and health. One recent study found lower body mass index among adolescents who live near a supermarket.¹¹ People who are overweight are at much greater risk of developing type-2 diabetes than normal weight individuals.¹² Another study documented that fruit and vegetable intake increases as much as 32 percent for each additional supermarket in a community.¹³

Map 5: Income and Diabetes-related Deaths, shows mortality data by income in New York City for diabetes. The red areas indicate a higher rate of diabetes-related deaths occurring in lower-income areas. The yellow areas indicate a higher rate of diabetes-related deaths occurring in higher-income areas of New York City. The blue and green areas indicate a lower rate of diabetes-related deaths.

Diabetes-related deaths create untold suffering and expense in communities. Diabetes-related deaths are associated with many factors, including the procurement of a nutritionally adequate diet. As the maps show, many communities are not well served by supermarkets. For lower-income neighborhoods, the lack of a supermarket negatively impacts people's ability to obtain a nutritionally adequate diet.

Map 6: Areas with Greatest Need, shows lower-income neighborhoods in New York City where there are low supermarket sales because there are few to no supermarkets located there, and a high number of deaths due to diabetes. These neighborhoods have the greatest need for more supermarkets.

As this and previous maps demonstrate, many areas in New York City are underserved by supermarkets. As a result, lower-income residents have to rely on expensive and limited corner stores, or travel long distances to shop for affordable food. At the same time, the incidence of diabetes-related deaths is extremely high, especially in inner-city neighborhoods.





Conclusion

The number of supermarkets—access to supermarkets—is a problem in many neighborhoods, but exceedingly so in lower-income neighborhoods where the incidence of diabetes is alarmingly high.

The lack of supermarkets in certain neighborhoods means that residents must shop at convenience and corner stores. Diets that rely on food from convenience stores are often higher in foods that contribute to diet-related disease.

The increased incidence of diabetes in lower-income neighborhoods suggests that the public sector needs to invest in supermarket development in neighborhoods, to help combat disease. Many neighborhoods have few to no supermarkets. The greatest needs are in those neighborhoods where the incidence of diet-related disease is highest.

Supermarkets exist in lower-income neighborhoods in New York City and inner-city communities across the nation. However, supermarket developers seek sites with specific characteristics, and assembling sites with these characteristics is more challenging in inner-city environments.

The public sector has a responsibility to help provide a safe and nutritious food supply in underserved communities, in order to safeguard public health and promote economic development. As supermarkets replaced public markets, the public sector largely withdrew from food retailing. Supermarkets later withdrew from many communities, leaving neighborhoods and large numbers of people without a stable food supply. At the same time, the incidence of diet-related diseases increased in these neighborhoods.

This conclusion is stark for people of lower incomes. People who live in lower-income areas without access to supermarkets appear to suffer from diabetes-related deaths at a rate higher than that experienced by the population as a whole. Based on additional studies conducted by The Food Trust,¹⁴ and others,¹⁵ access to fresh, affordable and nutritious food plays a role in determining what people eat. People with access only to poor food eat poorly.

Through mapping, this study shows that many low-income neighborhoods in New York City have both poor supermarket access and a high incidence of diabetes-related deaths. The number of supermarkets in New York City has declined by one-third in the past six years. This study demonstrates that this issue is related to significant health problems that adversely impact lower-income neighborhoods.

Recommendations

The number of supermarkets in a neighborhood is a key factor contributing to the health and development of that community. People living in lower-income areas, without access to supermarkets, suffer from diabetes-related deaths at a rate higher than that experienced by the population as a whole.

In response to this problem, we are making three key recommendations to New York state and local governments.

First, we need to erase the gap in the number of supermarkets between low- and higher-income communities, through significant public investment.

In order to do that, we need to build on the groundwork that has already been laid, and convene leaders from the business, government, public health, civic and community sectors to develop a strategy to create more supermarkets in lower-income communities.

Finally, a lynchpin of that strategy is for state and local governments to create a grant and loan program to support local supermarket development projects in order to increase the availability of affordable and nutritious food in underserved communities.

¹⁴ The Food Trust, The Philadelphia Health Management Corporation (2006). Food Geography: How Food Access Affects Diet and Health. Philadelphia, PA

¹⁵ Morland K, Wing S, Diez Roux AV (2002). The contextual effect of the local food environment on residents' diets: The Atherosclerosis Risk in Communities Study. American Journal of Public Health. 92(11):1761-1767

¹⁶ Shulman, Robin (2008). Groceries Grow Elusive For Many in New York City. Washington Post, February 2008.

Appendix: GIS Methodology

SUPERMARKET SALES

Trade Dimensions 2007 Supermarket data was mapped in ArcGIS 9.2. Stores were plotted using the Latitude and Longitude coordinates for each record. A supermarket was defined as having an annual sales volume equal to or greater than \$2 million or recognized by The Food Trust in coordination with the New York City Department of City Planning as a store that sells a wide range of products, including fruits and vegetables. There were 798 supermarkets in New York City with an aggregate weekly sales volume of \$126,041,000. The results for the density of supermarket sales are displayed in Map 1: Weekly Sales Volume for Supermarkets.

POPULATION

Population data for 2006 was obtained at the Census block group level through the ArcGIS Business Analyst extension, which includes estimates for key demographic variables from the U.S. Census of the Population. Block groups with no population were removed from the analysis and indicated on each map. The population density (per sq. mile) was calculated from the Census block group points using kernel density estimation.

SALES AND POPULATION

Sales to population ratios were obtained by dividing the raster grid of weekly sales volume density (from Map 1) by the raster grid of population density. The citywide sales to population ratio was calculated by dividing NYC's total weekly supermarket sales by its total population (\$126,041,000 / 8,270,881 = \$15.24). The odds ratio of sales to population was obtained for each supermarket by dividing the raster grid representing the local sales to population ratio by the citywide ratio (\$15.24). An odds ratio of 1 is equivalent to the citywide rate. Anything below 1 is below the city rate. An odds ratio of 2 means the local area is twice the citywide sales to population ratio. This is used for Map 2: Supermarket Sales and Total Population.

INCOME

The median household income, the number of households and the total population in 2006, as estimated by ESRI (Environmental Systems Research Institute), Inc. and made available through the ArcGIS Business Analyst extension, was used to calculate the odds ratio of per capita income for each block group. The median household income of the block group was multiplied by the number of households and then divided by the total population of the block group. The citywide per capita income was calculated by multiplying the citywide median household income by the total number of households and then dividing by the total population of the city ((\$46,720 * 3,095,513) / 8,270,881 = \$17,485.73). The local per capita income was divided by the citywide per capita income (\$17,485.73) to obtain the odds ratio for each block group. A raster grid of the odds ratio was then interpolated using inverse distance weighting. An odds ratio was considered high if it was greater than 1, so greater than the citywide per capita income, and low if it was less than 1.

SALES AND INCOME

The sales to population and per capita income odds ratio raster grids were reclassified into high and low areas (above 1 is high and below 1 is low). The reclassified raster grids were then converted to polygons to facilitate the association of areas with high and low sales odds ratios with areas that have high and low income odds ratios. The areas were combined with a union operation and display as four possible high and low combinations. The four combinations are displayed on Maps 3 and 4: Supermarket Sales and Income and Low Supermarket Sales and Low Income.

DIABETES-RELATED DEATHS

Mortality data, which contained a list of codes indicating the cause of death, was obtained from the New York City Department of Health and Mental Hygiene for the year 2005. The dataset consisted of all deaths recorded in New York City and included 57,068 records; 52,957 of which were persons who lived in one of the five boroughs of New York City. A total of 1,729 diabetes-related deaths (out of the 52,957 total deaths for New Yorkers) were recorded in New York City in 2005.

Mortality data were made available at the zip code level of geography. The data were summarized for each zip code to obtain a count of diabetes-related deaths per zip code and tabular data was joined to the polygon shapefile of zip codes for NYC.

DIABETES-RELATED DEATHS AND POPULATION

Given mortality data is at the zip code level. Zip code population data for 2006 was obtained from ESRI's Business Analyst extension data, which provides projections of demographics based on the 2000 U.S. Census of the Population.

The total number of diabetes-related deaths attributed to each zip code was divided by the total population of that zip code. This result was then divided by the citywide ratio of diabetes-related deaths to total population (1,729 / 8,270,881 = 0.000209046654, or 2.0905 diabetes-related deaths per 10,000 people) to create an odds ratio.

The raster grid of the odds ratio for diabetes-related deaths was reclassified into two levels—below and above 1. An odds ratio of 1 or less means the local number of diabetes-related deaths per capita is less than or equal to the citywide rate of diabetes-related deaths. An odds ratio greater than 1 means the local rate is greater than the citywide rate of diabetes-related deaths. The reclassified raster was converted to a polygon shapefile consisting of the areas with high and low diabetes-related deaths.

DIABETES-RELATED DEATHS AND INCOME

The polygon shapefile of high and low values for diabetes-related deaths was merged, using a union, with the polygon shapefile of high and low values for per capita income, which was created for Map 3: Supermarket Sales and Income. Areas with high and low diabetes-related death rates were matched with areas with high and low income odds ratios. The result is displayed in Map 5: Income and Diabetes-related Deaths.

DIABETES-RELATED DEATHS, SALES AND INCOME

The polygon shapefile of high and low values for the diabetes-related deaths odds ratio was merged, using a union, with the polygon shapefile of high and low values for the supermarket sales and per capita income odds ratios. Areas with high odds ratios for diabetes-related deaths were matched with areas with low odds ratios for supermarket sales and income. The result is displayed in Map 6: Areas with Greatest Need.



Building Strong Communities through Healthy Food

The Food Trust is a nationally recognized nonprofit organization working to ensure that every child and family has equal access to affordable and nutritious food. The mission of the Trust is to increase the availability of fresh foods, develop a stable food supply in underserved communities, and improve the connection between urban and agricultural communities.

The Trust partners with over 100 organizations nationally. Our goal is to create a fair and responsible food and farming system that prioritizes resources for lower-income people, especially children, and consists of better food stores, nutrition education in schools, and grassroots leaders in underserved communities working with state and federal government leaders to ensure that everyone has equal access to affordable and nutritious food.

To bring this new food system to fruition, we focus our work in three key areas: initiatives to improve food access; education and marketing campaigns to help consumers improve their health and sustain the environment; and public policies that advance these initiatives. We work with farmers, teachers, health practitioners, food retailers, nutrition educators, policy-makers, grassroots leaders, anti-hunger advocates, and nonprofit and for-profit entrepreneurs.

In Pennsylvania, the Trust led an advocacy campaign that resulted in the creation of the nation's first statewide financing program. The Fresh Food Financing Initiative (FFFI) is an innovative program that works to increase the number of supermarkets or other grocery stores in underserved communities across Pennsylvania. The initiative serves the financing needs of supermarket operators that plan to operate in these underserved communities where infrastructure costs and credit needs cannot be filled solely by conventional financial institutions.

Financial support for the work of the Trust comes from individual contributions, grants from private sources, churches, government agencies and foundations, and fees for services.

For more information, or to order additional copies of this report, visit www.thefoodtrust.org or contact the Trust at:

THE FOOD TRUST

One Penn Center, Suite 900 1617 John F. Kennedy Blvd. Philadelphia, PA 19103 215 575-0444 215 575-0466 FAX

e-mail: contact@thefoodtrust.org web site: www.thefoodtrust.org



