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Different Measures of Food Access Inform Different Solutions

by Paula Dutko and **Michele Ver Ploeg**

Access by all Americans to healthful and affordable food is a core goal for local and national food and nutrition assistance programs. Making more healthful foods available and affordable may help people make better food choices--choices consistent with healthier diets and lower incidence of obesity and other diet-related diseases. In fiscal year 2012, USDA spent $106 billion on 15 domestic food and nutrition assistance programs that provide food or benefits to purchase food for millions of children and low-income adults. These programs represent a significant national investment, accounting for over two-thirds

of USDA's budget.

Yet issues of access persist. In recent years, attention has turned to measuring and assessing individuals' access to stores and, in particular, stores with affordable and nutritious foods. Recent research has examined a number of factors affecting access, including the distance that individuals have to travel to stores that carry a wide array of nutritious food, the price of these foods, the availability of private cars to get people to and from stores, and the number of stores available to them.

Highlights:

- Multiple indicators can be used to measure access to affordable and nutritious food, yielding different estimates of the number of Americans with limited access.
- Between 2006 and 2010, the number of low-income individuals living more than 1 mile from a supermarket increased, but more individuals had access to vehicles in 2010 to travel to and from stores.
- Food access measures reveal that low-income areas with extreme poverty are more likely to be food deserts and to remain so over time.

Local studies are often able to examine factors related to food access in greater detail but they do not provide a national-level assessment. A consistent national measure of food access offers policymakers a tool to quantify the extent of the problem, identify areas of the country most in need of increased support, and chart national progress toward improving food access. ERS researchers have developed and recently updated several national measures of food access, providing estimates of the number of individuals and geographic areas with limited access to healthful and affordable food across the entire United States.

ERS Estimates Food Access on an Individual Basis…

In 2009, ERS conducted a national assessment of the extent of limited access to affordable and nutritious foods as part of a study requested by the U.S. Congress. This request arose from a growing concern that Americans living in some poor communities lacked access to stores that carry the foods needed for a varied and healthful diet, such as fresh fruits and vegetables, whole grains, and low-fat dairy products. Instead, individuals in these areas may be more reliant on convenience stores or fast food restaurants with limited food offerings. Such a disadvantage in choice may be linked to poor diets and, ultimately, to obesity and other diet-related diseases.

The 2009 study, using population numbers from the 2000 census and store location information from 2006, contained both individual-based and area-based access estimates, which each provide unique insights and perspectives for potential solutions. Individual-based estimates included the number of people living beyond a threshold distance from a supermarket, supercenter, or large grocery store. Supermarkets, supercenters, and large grocery stores were grouped under the name "supermarkets" and were used as proxies of sources of healthful foods because of the ready availability of fresh produce, whole grains, low-fat dairy products, and other healthful food products. Store locations as of 2006 were provided by TDLinx, a proprietary database listing food retail locations across the United

States, and by a list from USDA's Food and Nutrition Service of retail foodstores authorized to accept Supplemental Nutrition Assistance Program benefits (formerly called food stamps). Smaller stores were excluded as they frequently provide a smaller selection of healthful foods, often at higher prices. The analysis also excluded farmers' markets due to limited national data, as well as the fact that many of these markets operate only on a seasonal basis and with limited hours.

ERS reported individual-based estimates by socio-demographic characteristics such as income level, race and ethnicity, availability of private vehicles, and urban or rural residence. For example, ERS estimated that 30.2 million people, or 11 percent of the U.S. population in 2006, had low incomes (less than 200 percent of the Federal poverty threshold) and lived more than 1 mile from a supermarket.

… And on an Area Basis

To narrow the scope, the 2009 study also provided area-based estimates focusing solely on low-income areas. An area was considered low income if 40 percent or more of the residents had incomes less than or equal to 200 percent of the Federal poverty threshold. In these estimates, ERS used separate distance markers in urban and rural areas to delineate those with low food access. In 2006, 9.9 million people lived in low-income urban areas more than 1 mile from a supermarket, and 2.3 million people lived in low-income rural areas more than 10 miles from a supermarket.

The 2009 report did not identify specific areas as food deserts--geographic areas in which a substantial portion of the population experiences the dual problems of low income and limited food access--and measured areas using 1-square-kilometer grid cells. These grid cells provide consistency in defining geographic areas across the country and increased precision in measuring distance. However, they are not widely used geographical units and do not have a standard identification system. In subsequent research using the same 2006 store data and 2000 census data, ERS identified food desert areas and measured access at the level of census tracts, a more commonly used unit. A census tract is a small, relatively stable subdivision of a county that usually contains between 1,000 and 8,000 people and generally averages around 4,000 people.

This food desert analysis was performed to support an effort of three Federal agencies--the Departments of Treasury, Agriculture, and Health and Human Services--to coordinate and assist projects to improve food access in underserved areas. ERS identified tracts as low income if either 20 percent or more of the tract population had incomes below the Federal poverty threshold, or if the median family income for the tract was less than or equal to 80 percent of the statewide or surrounding metropolitan area's median family income.

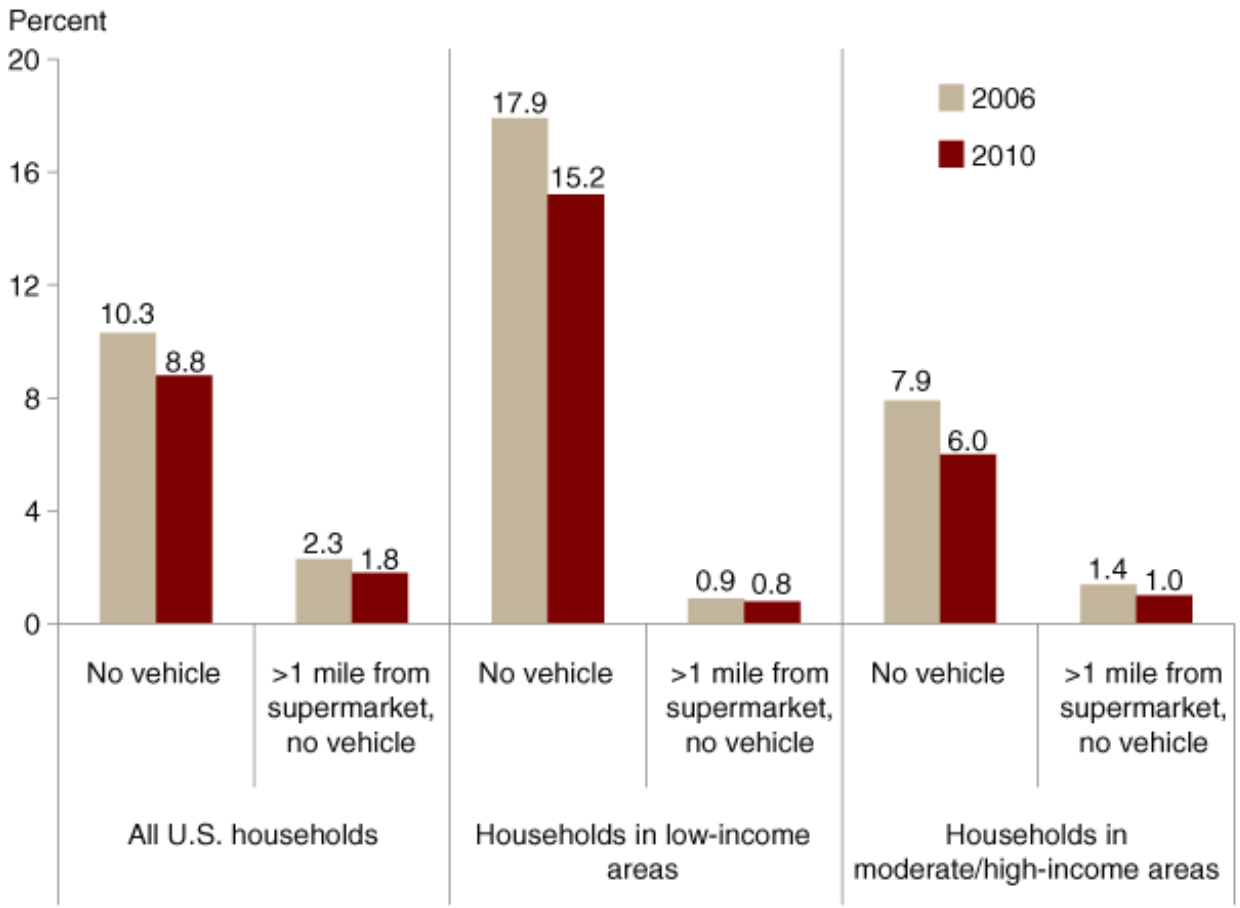
Tracts were identified as food deserts if, in addition to meeting low-income criteria, at least 500 people or 33 percent of the tract population lived farther than 1 mile from a supermarket in urban areas, or farther than 10 miles in rural areas. These analyses indicated that about 10 percent of all tracts in the United States, containing 13.6 million people with low access, were food desert tracts in 2006.

Greater Availability of Vehicles Promotes Greater Food Access

Data from the 2010 census show growth in the number of low-income people and low-income neighborhoods over the past decade, reflecting both stagnant incomes during these years and the effects of the 2007-09 recession. Using 2010 census and store location data, ERS estimated that the number of individuals earning less than 200 percent of the Federal poverty threshold and living more than a mile from the nearest supermarket was 35.6 million, or 11.6 percent of the U.S. population in 2010, up from 11 percent in 2006.

While some individuals may live far from the nearest supermarket, having access to a private vehicle may mitigate the influence of distance. Although the number of people living in low-income areas far from a supermarket increased between 2006 and 2010, other census data show that household access to private vehicles also grew. According to 2010 data, 2.1 million households, or 1.8 percent of all U.S. households, lived farther than 1 mile from the nearest supermarket and lacked access to a vehicle. This compares with 2.4 million households, or 2.3 percent of all households, in 2006. Vehicle access increased between 2000 and 2010 for both low- and high-income households.

Vehicle access improved for households more than a mile from the nearest supermarket from 2006 to 2010



Source: USDA, Economic Research Service.

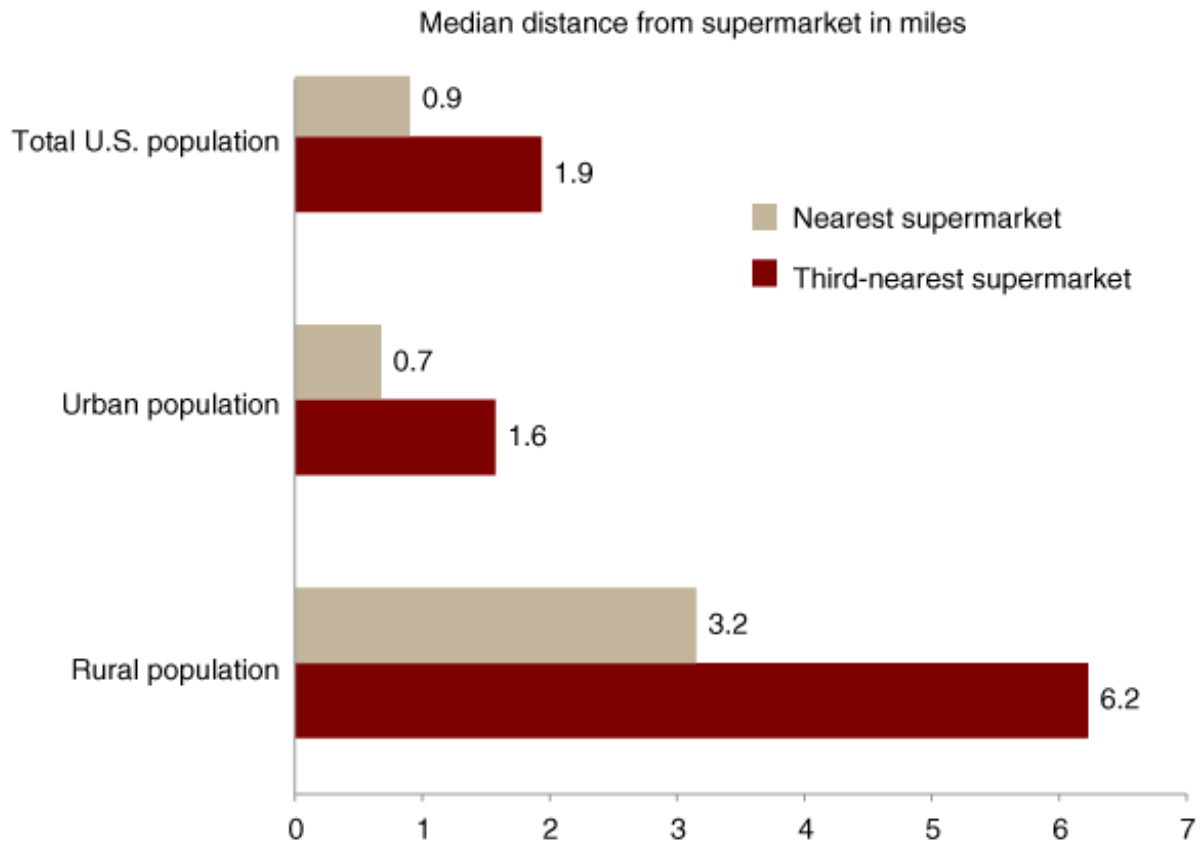
Such differences highlight the importance of including vehicle availability in the definition and measurement of limited food access. ERS's Food Access Research Atlas, an online mapping tool that provides a national picture of food access at the census tract level, has recently been released. In addition to mapping areas with low income and low access in 2010, users can add data layers for various tract characteristics, such as vehicle availability, to provide more information on a census tract's food access characteristics (see box, **"ERS Mapping Tools Provide a Richer Picture of Food Access"**).

A Majority of Americans Live Within 5 Miles of Multiple Supermarkets

In addition to vehicle ownership, the extent to which a supermarket faces competition from other stores in the community may be important. Simply measuring distance to the nearest single supermarket may be inadequate for estimating access to affordable and healthful food, as quality, product availability, and price often vary among supermarkets, particularly between stores in low-income versus higher income areas. The ability to shop in multiple competing stores usually equates to better prices and a wider selection. To investigate this issue, ERS expanded access measures to include distance to the third nearest supermarket for the population of the United States.

In 2010, half of the U.S. population lived within 2 miles of three supermarkets; 80 percent of the population lived within 5 miles. In all urban areas, the median distance to the third nearest supermarket was 1.6 miles; in rural areas, the median distance was 6.2 miles. Distance to the third nearest supermarket was consistent across income levels: 80 percent of the low-income population lived within 5 miles of the nearest three stores, while 80 percent of moderate- and high-income individuals were 4.7 miles from the nearest three stores. This indicates that the supermarkets serving low-income individuals face a similar level of competition as those serving higher income shoppers.

Half of the U.S. population lived within 1 mile of a supermarket and within 2 miles of three supermarkets in 2010



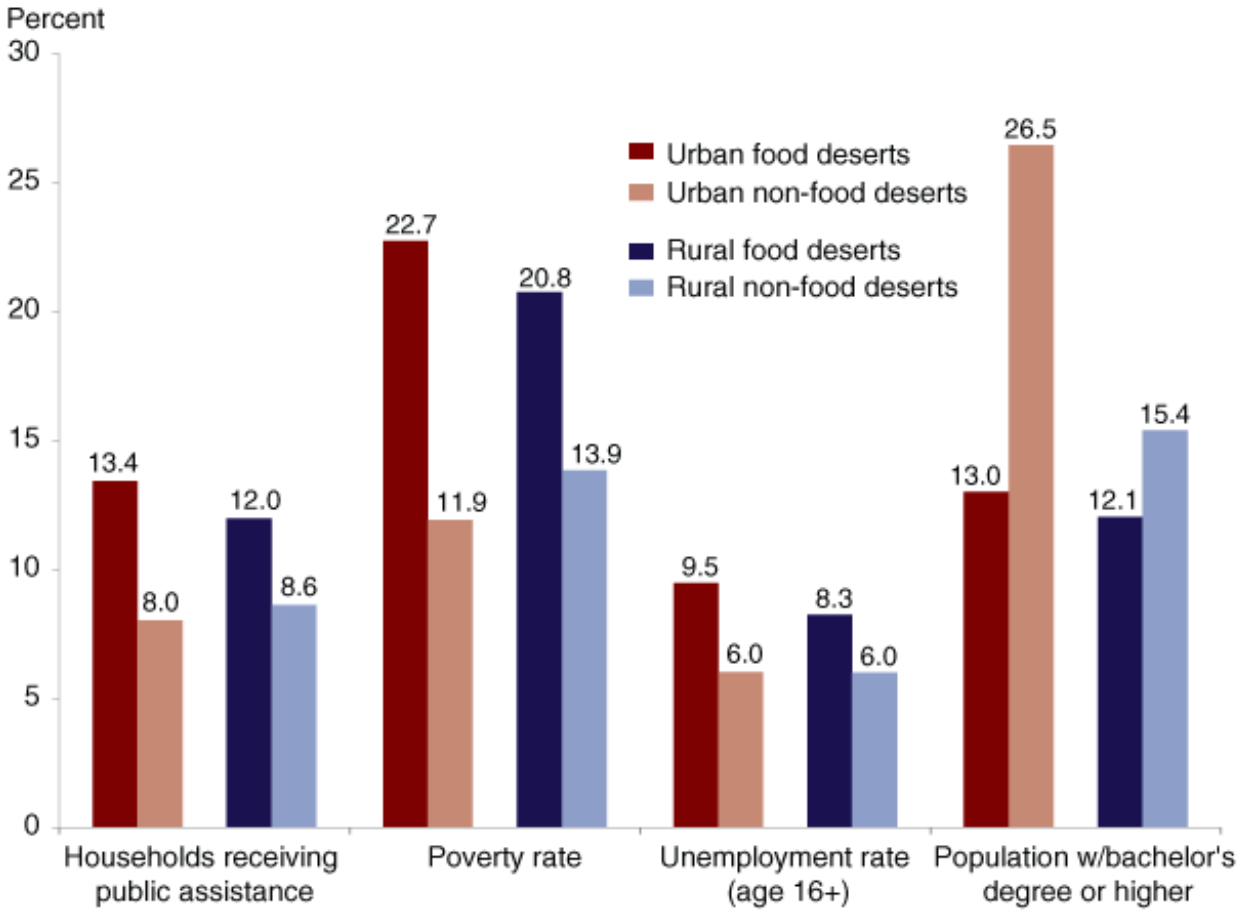
Source: USDA, Economic Research Service.

Poorest Areas More Likely To Remain Food Deserts

ERS researchers also analyzed the characteristics of food deserts across time and found that among all low-income areas, those with higher poverty rates are more likely to be food deserts and to remain so over time. Tracts that are characterized as food deserts have other disadvantages that may affect diet quality or availability of large grocery stores. Residents of food deserts are more likely to be unemployed and to receive public assistance, suggesting fewer resources with which to buy food. In addition, the population of food desert tracts is less educated--as measured by either the share of the population with a high school diploma or equivalent or the share

with at least a bachelor's degree--than the population of other areas. Lower education levels may indicate less knowledge about healthful diets and less familiarity with the consequences of unhealthful eating. Finally, these areas typically have smaller populations than tracts that are not characterized as food deserts, limiting their appeal to grocery stores that depend on sales volume to maintain profitability.

In 2000, food deserts had higher unemployment and poverty rates and lower education levels than non-food desert tracts



Source: USDA, Economic Research Service.

Different Problems, Different Solutions

A specific food access measure provides different insights depending on whether it focuses on individuals or areas. Individual-based measures of access can more directly measure access, for example, by considering access to a car, while measures focusing on areas, particularly low-income areas, help to highlight places where limited access is concentrated.

Using a combination of these methods to investigate changes in food access over time yields mixed results. The number of individuals who live in low-income areas and who are more than a mile from a supermarket has grown from 2006 to 2010. Yet vehicle availability for households improved over the same period, mitigating some of the challenges in traveling to a supermarket. Furthermore, half of the U.S. population lives within 2 miles of three supermarkets, indicating that many people do have access to multiple stores.

As the areas with the highest poverty rates are those most likely to be identified as low access as well, focusing on areas of high poverty may be effective for policymakers, particularly because the problems of low access and low income tend to persist in these areas over time. What is not known is whether the population of these areas changes over time--that is, whether people move to such areas temporarily in times of economic hardship and then leave once their well-being improves, or whether residents tend to stay in these areas and are persistently poor themselves. A stagnant and persistently poor population in low-income, low-access tracts would mean that residents of such tracts are exposed to these less healthy food environments for extended periods, potentially exacerbating the negative health effects of low food access.

Area-based measurements of low-income, low-access communities guide policy options that target low-income and low-access neighborhoods. For example, food access status can be used to help direct public and private funds for improving existing foodstores or providing incentives for construction of new stores in areas suffering from concentrations of low-income residents and limited food access. One State program, California Fresh Works Fund, joins public and private sectors to provide loans for fresh food retailers to locate in communities with limited access to nutritious foods.

Individual-based measures of food access also provide important information for policies aimed at improving food access for individual residents. Not everyone who faces food access barriers lives in low-income, low-access neighborhoods, and not everyone in low-income, low-access neighborhoods has trouble getting to a store. Measures of food access on an individual, rather than neighborhood, level enable policymakers to consider factors such as vehicle access, the availability and affordability of public transportation, or other transportation services for low-income or low-mobility residents.

Just as different ways exist to measure low access, different solutions may be appropriate depending on the scope of the program in question. Improving the availability and affordability of transportation can ease access problems if low-access populations are spread

out, while attracting new supermarkets or improving existing ones may be more effective if low-access populations are concentrated in specific areas. Further investigation of local, neighborhood-specific factors such as the availability of farmers' markets or small stores with affordable selections of fresh foods, as well as home delivery options for groceries, may mitigate the role of distance in limiting food access for Americans.

ERS Mapping Tools Provide a Richer Picture of Food Access

The Food Access Research Atlas is an online tool that maps census tracts in the United States. It provides data on census tracts with both low income and low access based on 2010 data, as well as more detailed data regarding vehicle ownership, the number of residents and share of a tract's population that have low incomes and live far from a supermarket at multiple distance measures, the share of children and elderly experiencing low access, and census tracts with a significant population living in group quarters, like college dorms. This tool enables policymakers and community organizations to obtain more information about what areas are in need of assistance. For more information, visit the **Food Access Research Atlas**.

Another ERS mapping tool, the Food Environment Atlas, provides additional detailed information about food environments across the United States. County- and State-level information is included on a multitude of food environment indicators that can influence food choices and, in turn, an individual's health and well-being. These indicators include the number and proximity of foodstores and restaurants, participation in food and nutrition assistance programs, and programs that bring farm foods to school cafeterias. For more information, visit the **Food Environment Atlas**.

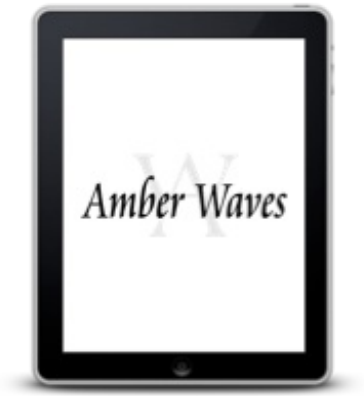
This article is drawn from...

Access to Affordable and Nutritious Food: Updated Estimates of Distance to Supermarkets Using 2010 Data, by Michele Ver Ploeg, Vince Breneman, Paula Dutko, Ryan Williams, Samantha Snyder, Chris Dicken, and Phillip Kaufman, USDA, Economic Research Service, November 2012

Characteristics and Influential Factors of Food Deserts, by Paula Dutko, Michele Ver Ploeg, and Tracey Farrigan, USDA, Economic Research Service, August 2012

You may also be interested in...

Access to Affordable, Nutritious Food Is Limited in "Food Deserts", by Michele Ver Ploeg, USDA, Economic Research Service, March 2010



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