Phil R. Kaufman

Rural Poor Have Less Access to Supermarkets, Large Grocery Stores

Poor households in rural areas rely more on smaller grocery stores and supermarkets than do metro area households, and they may face higher average food prices and reduced access to food as a result. Net accessibility—a ratio of available large grocery store sales to potential food spending by households in a ZIP Code-based area—was found to be lower for a greater percentage of low-income households compared with all households in the Lower Mississippi Delta. Over 70 percent of the total low-income population (eligible to receive food stamp benefits) in the 36-county area suffered accessibility shortfalls, requiring trips of more than 30 miles to reach a large retailer. Smaller foodstores typically offer less variety, fewer lower cost foods, and higher food prices.

Differences in access to foodstores can significantly affect both the prices households face and their average food costs. A recent ERS report found that the retail food prices faced by households varies with the type of store and its location. Rural households face supermarket prices about 4 percent higher than suburban area supermarkets, where prices are lowest (Kaufman and others). Overall, supermarkets had lower prices—about 10 percent lower nationwide, on average—than other grocery stores such as superettes, convenience stores, and "mom and pop" stores. Prices are likely to be lower in supermarkets because supermarkets can take advantage of scale economies (as sales increase, per unit costs decline). As a result, supermarkets have lower store margins—the markup over cost of goods sold—compared with smaller outlets, allowing for lower prices. The larger physical size of supermarkets also allows for greater product variety, including many lower cost store-label and generic items.

Rural areas contain fewer supermarkets and a larger proportion of smaller grocery stores compared with metro areas. Low-income rural households are less likely to use supermarkets, according to analysis of food stamp redemption data. Although poor households spent 76.7 percent of food stamps in supermarkets nationwide, rural supermarkets accounted for just 58.9 percent of all rural food stamp redemptions. In low-income rural areas, supermarkets accounted for only 52.8 percent of total redemptions while, by contrast, 84.1 percent of all suburban area food stamps were redeemed in supermarkets. Because of price differences between supermarkets in rural and suburban areas, and the lower use of supermarkets in poor rural areas, those households face food prices about 2.5 percent higher, on average, than other rural households and 3.1 percent higher than suburban households. While these differences reflect the average for all poor rural households, more distant households may face significantly higher food prices to the extent that supermarkets and other large retail food outlets are not accessible to them.

Although households in poor rural areas may face higher food prices, their actual food costs may vary through more economical and lower quality item selections. The ERS study also compared different brands and package sizes available within a food category, such as canned peaches, and found considerable variation after converting to a price per ounce. Compared with a leading brand and package size, both larger container sizes and store-label brands contributed to a lower price per ounce. Households are able to offset higher item prices by selecting

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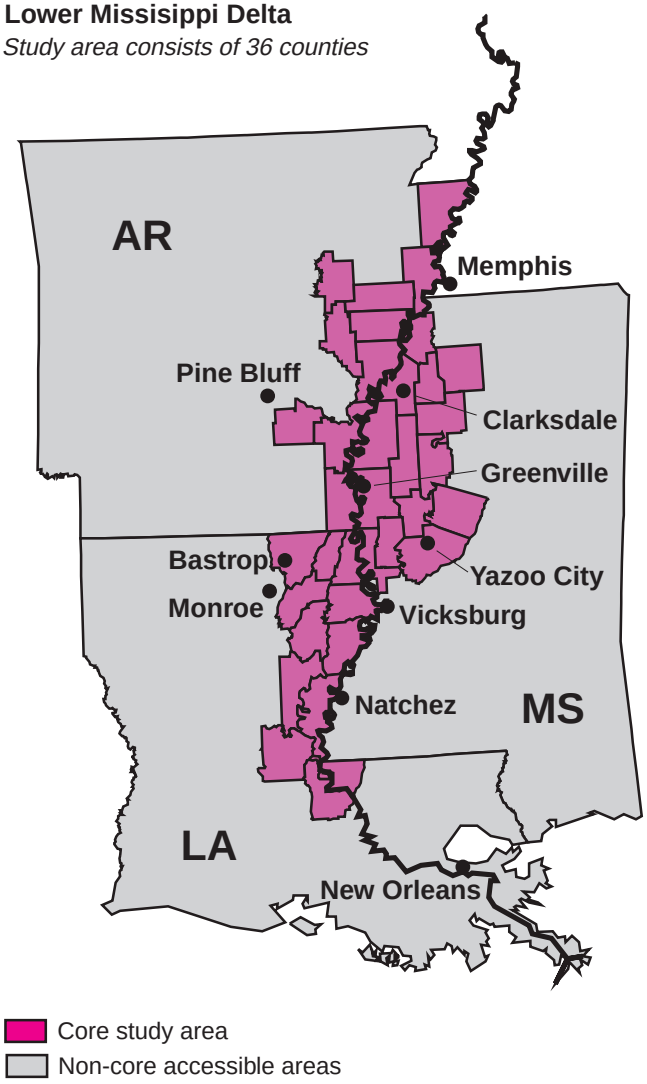
items within food categories that have a lower price per ounce. Larger retail food outlets are more likely to offer greater variety and more economical brands and package sizes, relative to smaller foodstores.

These results underscore the importance of access to larger retail food outlets as sources of both lower food prices and average household costs—features less likely to be found in many rural areas. ERS has recently attempted to measure access to foodstores in rural counties of the Lower Mississippi Delta region of Arkansas, Louisiana, and Mississippi to better assess the availability of retail foodstores to poor households there.

Lower Mississippi Delta Region Households Mostly Rural, Low-Income

The study area consisted of 36 rural, high-poverty counties bordering the Mississippi River (fig. 1). The selection of the Lower Mississippi Delta region serves two objectives. First, prior studies of food access have mostly centered on households in urban metro areas, since they account for more than three-fourths of the total U.S. population (Cotterill and Franklin). However, rural areas tend to lack public transportation services and large food retailers are fewer, resulting in greater travel distances. Second, the selection of the Lower Mississippi Delta region for the study of rural access supports the work of the Nutrition Intervention Research Initiative (NIRI). The NIRI is a consortium of seven partners, including the U.S. Department of Agriculture and six higher education and research institutions located in the region, whose aim is to improve the health and well-being of people in the Lower Delta region. Access to foodstores and the development of initiatives to improve low-income household access to affordable, quality food is one of the objectives of the NIRI consortium.

Figure 1
Lower Missisippi Delta
Study area consists of 36 counties



Source: Economic Research Service, USDA.

The Mississippi River dissects the region, extending more than 375 miles and separating Arkansas and Louisiana from Mississippi. This contributes to the isolation of the region, due to the limited number of crossings. Between the northernmost and southernmost counties of the core study area, there are crossings at Memphis, TN; Greenville, MS; Vicksburg, MS; and Natchez, MS. Major cities and towns in the area include Greenville, MS (pop. 45,226), Vicksburg, MS (pop. 20,908), Natchez, MS (pop.19,460), and Clarksdale, MS (pop. 19,717). The nonurban and rural population (that is, living in places of less than 2,500 inhabitants) represented 55 percent of the total. The non-White population represented 49.5 percent of the total, with Blacks the largest minority group.

The core study counties are characterized by relatively high poverty rates. For the 36 counties, median household income averaged $14,696 per year in 1990, according to the Census of Population, compared with the U.S. median household income of $35,225 per year. This is just above the poverty income threshold for a family of four in 1990. In the core study region, 20.2 percent of all households received some form of public assistance (excluding food stamps) while 29.4 percent of households received food stamp benefits. Analysis of household income by ZIP Code revealed that 54.5 percent of households in the study area had incomes of less than $15,000 annually in 1990.

Poor Households Rely More on Smaller Foodstores

The 36-county core study area contained 222 large food retail outlets, including both grocery stores (annual sales between $500,000 and $2 million) and supermarkets (annual sales of $2 million or more). Their combined gross sales (both food and nonfood items) amounted to $909 million in 1993, while food stamp redemptions in these stores totaled $113 million (table 1). Among large food retailers, super-

Table 1

Large food retailer sales and food stamp redemptions by store sales class, Lower Delta core counties

Low-income households spend more in smaller supermarkets and grocery stores than larger supermarkets

Store sales class	Gross sales		Food stamp redemptions	
	$1,000	Percent	$1,000	Percent
Large supermarkets[1]	493,282	54.3	47,826	42.4
Small supermarkets[2]	317,984	35.0	50,361	44.6
Large grocery stores[3]	97,672	10.7	14,721	13.0
Total food retailers ≥ $500,000	908,938	100.0	112,908	100.0

[1]Annual sales $6 million or more.
[2]Annual sales $2 million up to $6 million.
[3]Annual sales $500,000 up to $2 million.
Source: Food and Nutrition Service, U.S. Dept. of Agriculture.

markets with annual sales of $6 million or more accounted for the largest share of gross sales (54.3 percent) but only made up the second-largest share of food stamp redemptions (42.4 percent). Low-income households relied on smaller supermarkets and grocery stores somewhat more than did all households in the core counties. These differences in spending at large retailers between all households and low-income households are consistent with reduced mobility among the poor in rural regions.

Large food retailer availability can also be gauged by the average number of square miles per store for a given region or area. Overall, rural counties in Arkansas, Louisiana, and Mississippi averaged one supermarket per 153.5 square miles (Morris). By comparison, the 36 core counties averaged one supermarket per 190.5 square miles. When large grocery stores are included, the average square miles per large retailer in the core counties improved to 101.6. However, the food stamp redemption data indicate that only a small proportion of low-income food spending occurs in large grocery stores. Thus, as an indicator of distances between stores, the supermarket-based density measure is probably the more relevant.

Many Rural Households Face Accessibility Shortfalls

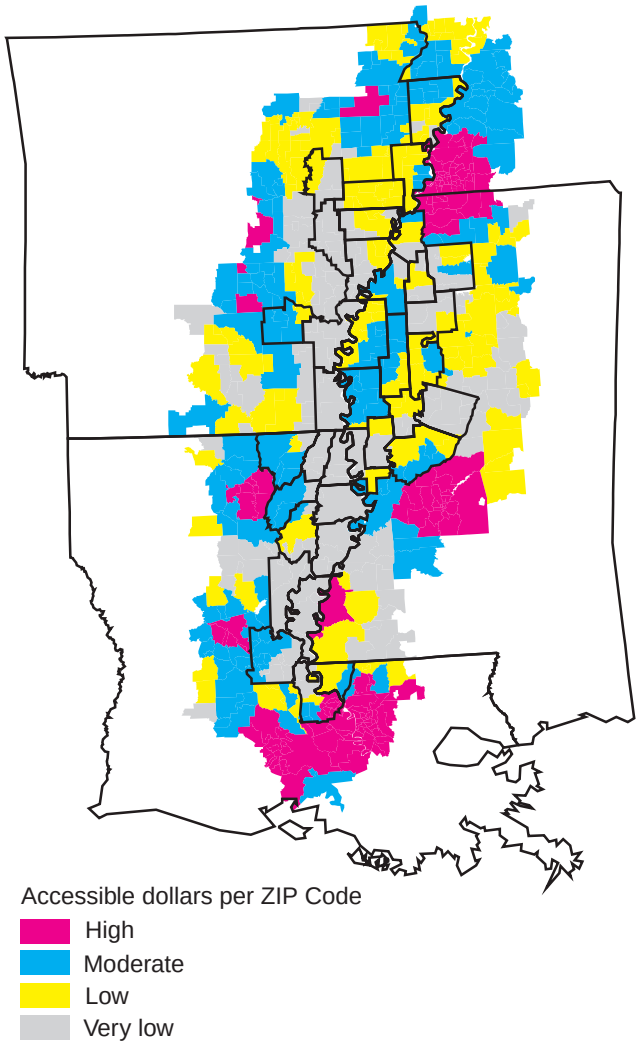
Results of the measure of household access to larger grocery stores—a measure of retail food supply—are given in figure 2. The level of accessible annual food dollars in the study area was separated into four ZIP Code quartiles. ZIP Codes in the highest accessible food sales quartile accounted for 57.2 percent of the study-area population, while 7.8 percent of the population were located in the lowest quartile.

A measure of accessible food spending demand—the level of household food expenditures available to a retail food location—was calculated in a manner similar to accessible

Figure 2

Accessible large grocery stores sales

The number and sales of grocery stores vary by location



Note: Outlined counties represent the core study area.
Source: Calculated by ERS from data provided by the Food and Nutrition Service, USDA.

retail food sales (accessible supply). Similar to the accessible supply measure, the ZIP Codes in the Lower Delta region were broken into quartiles for comparison purposes (fig. 3). The highest quartile accounted for 51.4 percent of the total study-area population, while 19.4 percent of the population were located in the lowest quartile.

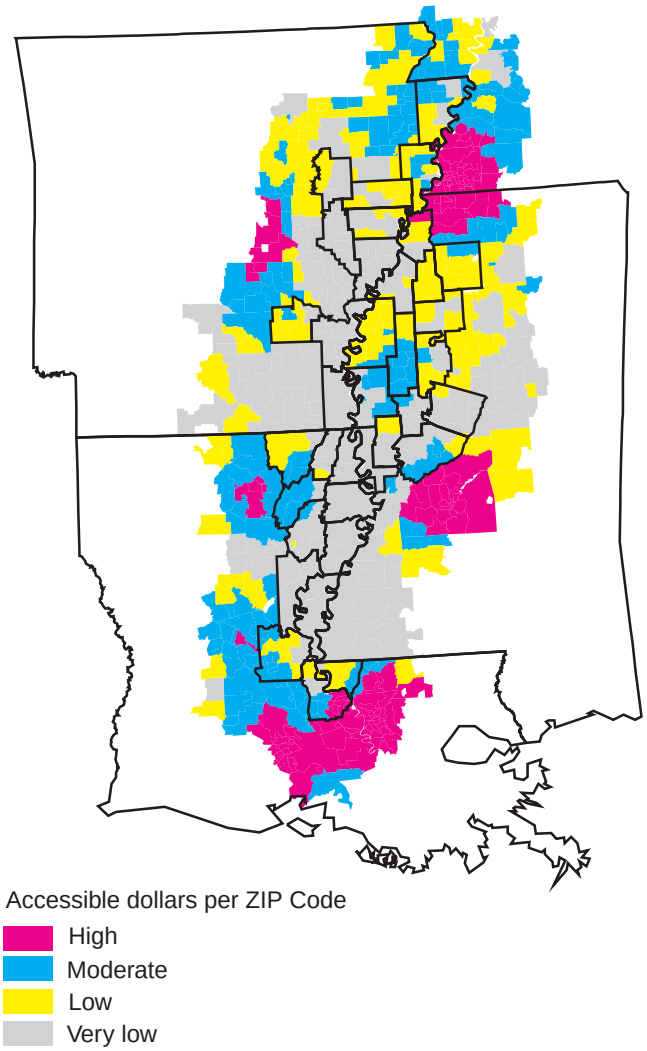
The range of net accessibility ratios in the Lower Delta region are tabulated in table 2 and depicted in figure 4. Of the 200 ZIP Codes that make up the 36-county core area, there were 76 ZIP Codes, or 38 percent, in which the accessibility ratio exceeded 1.0.

The remaining ZIP Codes experienced net accessibility ratios of less than 1.0—areas in which food expenditures are not fully satisfied by accessible large retailers.

Figure 3

Accessible retail food demand

Spending varies by population and income

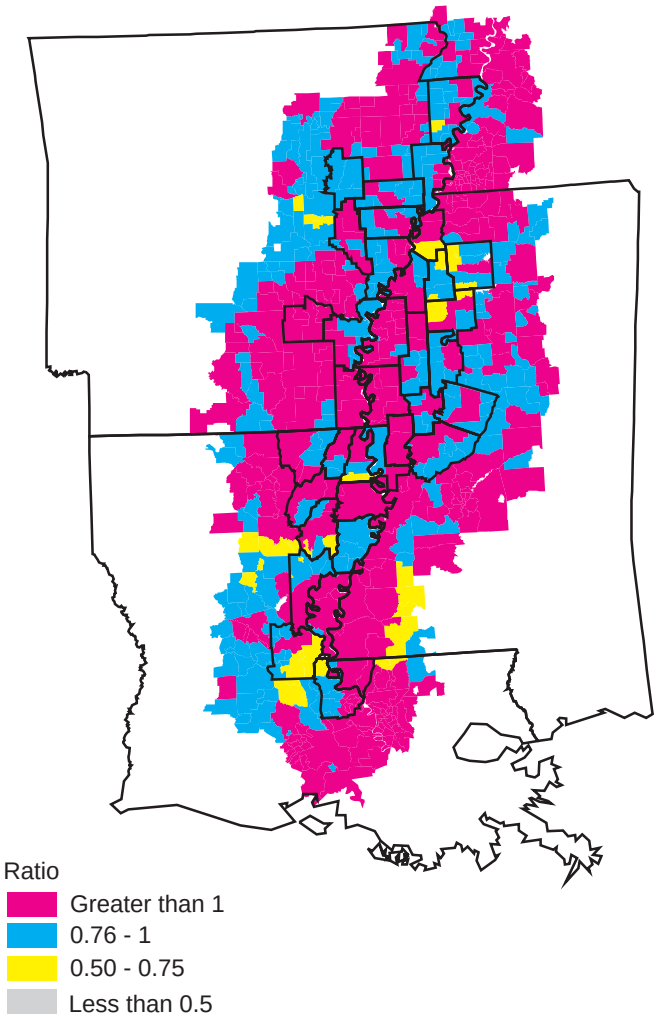


Note: Outlined counties represent the core study area.
Source: Calculated by ERS from data provided by the Food and Nutrition Service, USDA.

Figure 4

Net accessibility ratio, all households

Ratio measures supply relative to demand for retail food



Note: Outlined counties represent the core study area.
Source: Calculated by ERS from data provided by the Food and Nutrition Service, USDA.

Low-Income Households Face Lower Accessibility

The above analysis applies to all households, including higher income families that may find it feasible to travel considerable distances to reach large retail food outlets. Low-income households are less likely to travel greater distances if they (1) do not own or have access to transportation or (2) cannot afford the cost of transportation. In addition, while most low-income households are eligible to receive food stamp benefits to purchase food, transportation costs are not included. As a proxy for low-income household food purchases and sales by large retailers, aggregate Zip Code-level data were obtained from the Food and Nutrition Service, U.S. Department of Agriculture (FNS-USDA). These data include food stamp

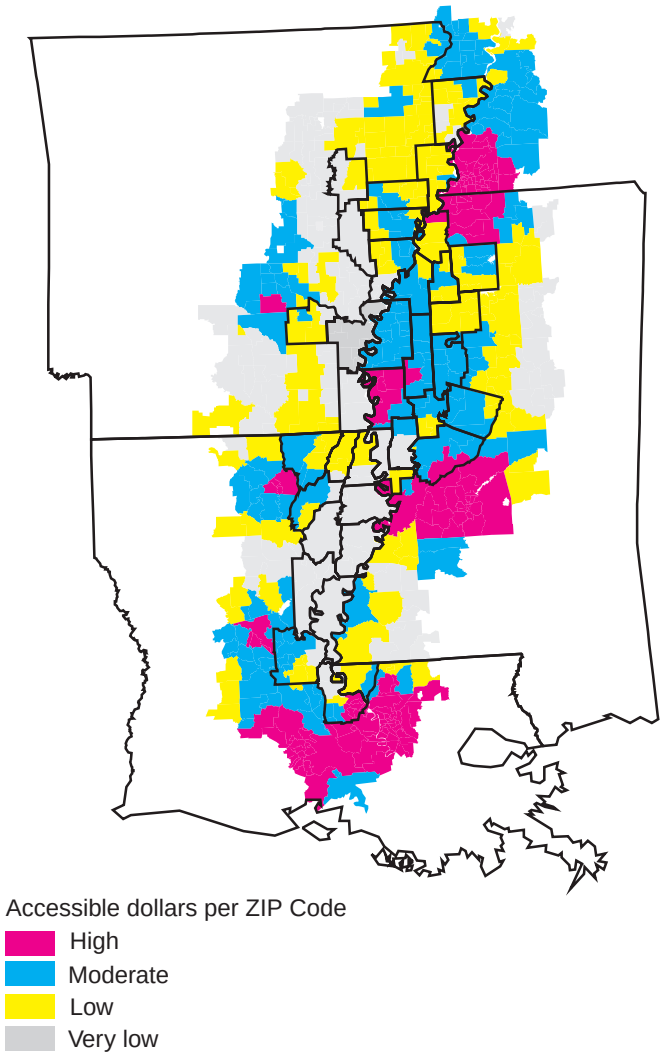
redemptions by large retailers and food stamp issuances made to households from each Zip Code in the Lower Delta region.

Low-income accessible supply was determined for each ZIP Code by calculating annual food stamp redemptions by stores to represent retail food sales. Differences in the level of accessibility to large grocery stores, including supermarkets, by low-income households are shown in figure 5. Low-income household accessible retail food demand is represented by total annual food stamp issuances to households for each ZIP Code in the Lower Delta region; accessibility is arranged by quartile (fig. 6).

Figure 5

Accessible large grocery store sales by poor households

Poor households have lower access to grocery stores

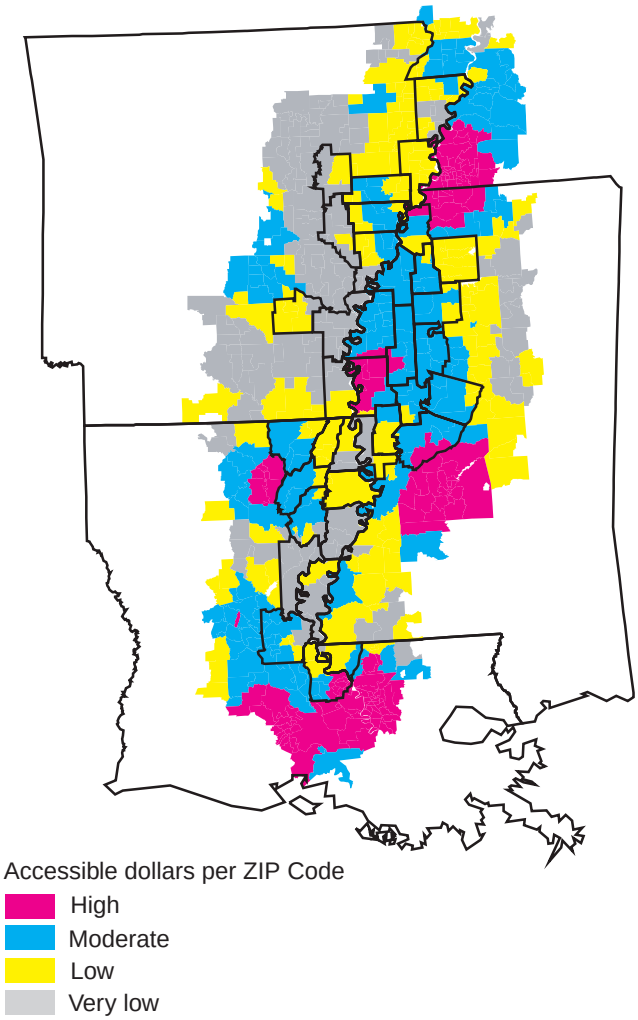


Note: Outlined counties represent the core study area.
Source: Calculated by ERS from data provided by the Food and Nutrition Service, USDA.

Figure 6

Demand for retail food by low-income households

Poor houseolds spend less for food



Note: Outlined counties represent the core study area.
Source: Calculated by ERS from data provided by the Food and Nutrition Service, USDA.

The ratio of accessible food stamp redemptions to accessible food stamp issuances is calculated for each ZIP Code similarly as the net accessibility ratio for all households. Of the 200 ZIP Codes in the 36-county core area, only 45, or 22.5 percent, have ratios exceeding 1.0, the condition most favorable to low-income households (table 3). Fully 77.5 percent of ZIP Codes experienced net accessibility shortfalls, affecting 69.2 percent of the total low-income population in the 36-county core area. Compared with net accessibility ratios of all households, low-income households appear to be disproportionately located in areas of net accessibility shortfalls (tables 2 and 3). Differences in net accessibility ratios in the Lower Delta region are depicted in figure 7. Within the core study counties, a

Table 2

Net accessibility of all households to larger food retailers: Lower Delta core counties[1]

The net accessibility ratio exceeded 1.0 in 38 percent of ZIP Codes, representing 72.4 percent of the total population in the Lower Delta region

Net accessibility ratio (R)	ZIP Codes	ZIP Code households	ZIP Code population	ZIP Code households without car
		Number		
Less than 0.5	0	0	0	0
0.5-0.749	22	9,567	28,319	1,570
0.75-1.0	102	65,832	198,526	11,950
More than 1.0	76	197,389	584,508	37,892
36-county total	200	272,788	811,353	51,412
		Percent share[2]		
Less than 0.5	0	0	0	0
0.5-0.749	11.0	3.5	3.5	16.4
0.75-1.0	51.0	24.1	24.5	18.1
More than 1.0	38.0	72.4	72.0	19.2

[1]Net accessibility ratio = (accessible food sales) / (accessible food expenditures).
[2]Percentages may not sum to 100 due to rounding.
Source: Economic Research Service, USDA.

Table 3

Net accessibility of low-income households to large food retailers: Lower Delta core counties[1]

The net accessibility ratio exceeded 1.0 in only 22.5 percent of Lower Delta ZIP Codes, representing less than one-third of the total low-income population

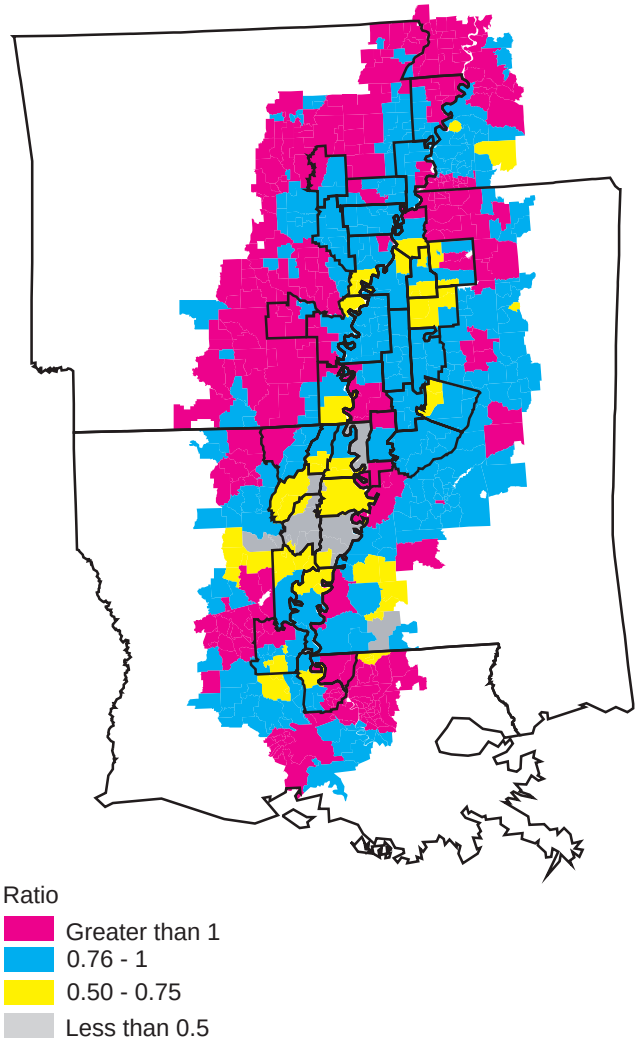
Net accessibility ratio (R)	ZIP Codes	ZIP Code low-income households[2]	Zip Code low-income population[3]	ZIP Code households without car
		Number		
Less than 0.5	9	7,209	21,626	na
0.5-0.749	35	21,698	65,097	na
0.75-1.0	111	49,137	245,051	na
More than 1.0	45	81,683	147,412	na
36-county total	200	159,727	479,186	na
		Percent share[4]		
Less than 0.5	4.5	4.5	4.5	na
0.5-0.749	17.5	13.6	13.6	na
0.75-1.0	55.5	51.1	51.1	na
More than 1.0	22.5	30.8	30.8	na

[1]Net accessibility ratio = (accessible food stamp redemptions) / (accessible food stamp issuances).
[2]Estimated.
[3]Based on 130 percent of poverty household income threshold.
[4]Percentages may not sum to 100 due to rounding.
na = Not available.
Source: Economic Research Service, USDA.

Figure 7

Net accessibility ratio, low-income households

Almost 70 percent of poor households have inadequate access to large grocery stores



Note: Outlined counties represent the core study area.
Source: Calculated by ERS from data provided by the Food and Nutrition Service, USDA.

relatively large share of the total area has insufficient net accessibility. Given their low-income status, households in these areas are less likely to travel to large retailers beyond the 30-mile retail range. To meet their retail food needs, they must rely more on small grocery stores and convenience stores.

Conclusions

Analysis of all households and low-income households indicated wide disparities in levels of accessibility to large food retailers across the Lower Delta region and within the core study area. Compared with the larger Lower Delta region, the 36-county study area had a greater share of highly rural households, a smaller share of urbanized population, and lower average household incomes—characteristics associated with less desirable locations for large food retailers. These factors likely contribute to the lower levels of net accessibility observed in the core study area.

Low-income households had a greater share of food stamp redemptions in smaller supermarkets and grocery stores, indicating that low-income households within the study area were more likely to use smaller grocery stores, convenience stores, and specialized foodstores offering fewer selections and generally higher prices. These results indicate that potentially large numbers of low-income households in the 36-county study area may lack access to lower cost foods.

For Further Reading . . .

Ronald Cotterill and Andrew Franklin, *The Urban Grocery Store Gap*, Food Marketing Policy Issue Paper No. 8, Food Marketing Policy Center, University of Connecticut, April 1995.

Phillip R. Kaufman, James MacDonald, Steve Lutz, and Dave Smallwood, *Do the Poor Pay More for Food? Item Selection and Price Differences Affect Low-Income Household Food Costs*. AER-759, USDA-ERS, Nov. 1997.

Patricia M. Morris, *Higher Prices Fewer Choices; Shopping for Food in Rural America*, Washington, DC: Public Voice for Food and Health Policy, May 1990.

U.S. Department of Agriculture, Food and Nutrition Service, "Food Stamp Statistical Summary of Project Area Operations Report," July 1993.

Measuring Accessibility to Foodstores

To compare differences in accessibility of households to foodstores in the Lower Mississippi Delta study area, the Geographic Information System (GIS) was used.

GIS is a research tool for analyzing spatial relationships, such as a geographic representation. GIS relies on geographic coordinates (latitude and longitude) to convey geographic, or "spatial," information. GIS also allows for the combining of traditional empirical information (data) associated with physical coordinates (locations), resulting in a spatial representation of empirical data. For example, GIS typically includes geo-reference data to create maps of ZIP Code boundaries within a given spatial area. Considerable demographic data, such as population characteristics, are available from the 1990 Census of Population, and other sources are available for ZIP Codes. When these data are combined with the geo-reference data of GIS, maps can be created to provide a spatial representation of the ZIP Code demographic data.

GIS can also be used to aid our understanding of spatial relationships, such as the relationship of a household location to a foodstore destination in a specified geographic area. All else being equal, as distance to a destination increases, the accessibility of the destination is said to decrease. In economic terms, the relationship of distance to retail food spending can be thought of as a "spatial demand curve" in which the quantity purchased of a good or service decreases both as the good's price increases and as the household's transportation costs to purchase the good increase.

In this study of rural foodstore access, GIS methods were used to calculate two separate accessibility measures: (1) accessibility to large retailers by households, a measure of accessible foodstore sales (accessible supply); and (2) accessibility to household food expenditures by foodstores, a measure of accessible household food spending (accessible demand). Due to the lack of detailed geographic coordinates (latitude and longitude) for locations of grocery stores, supermarkets, and households, ZIP Code area centroids (the physical center of a ZIP Code) were used to represent their geographic location. Accessibility measures were made from each ZIP Code location in the study to all ZIP Code destinations within a 30-mile radius of the ZIP Code.

The separate measures of accessibility corresponding to the supply and demand for retail food by themselves provide only partial indicators of food sufficiency. The overriding question concerning food accessibility is to what extent are the food needs of households being met by large retailers. The answer lies in the relative comparisons of accessible supply with accessible demand or the degree to which the two measures are in balance. In economic terms, we want to test whether accessible supply equals accessible demand for retail food. A "net accessibility" measure was developed to account for disparities between geographic areas, using the ZIP Code centroid as the reference location. For each ZIP Code, the ratio of accessible retail sales (supply) to accessible food expenditures (demand) was calculated. A "net accessibility ratio" of 1.0 indicates food supplies and expenditures are in equilibrium for a given ZIP Code centroid. When net accessibility exceeds 1.0, accessible supplies exceed demand. Of greatest concern is the condition in which the ratio falls below 1.0. Here, accessible supplies fall short of demand, implying that some portion of households' food spending cannot be met by accessible large food retailers.