Local Food Economics
Data Visualization Challenge

Food Access Inequity Index

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Section 1: *Define and justify what makes a strong or equitable local and regional food system.*
A strong and equitable local and regional food system (LRFS) provides consistent access to food sources for all local community members to live an active and healthy lifestyle. The goal of such a system would be to improve access, increase quantity, and ensure quality for all household members. Furthermore, sustainability is key for the long-term success of any food system. Collaboration between local government, food banks, private corporations, farmers, and the local community is essential.

Section 2: *Describe the variables chosen and explain why these variables were selected in relation to your definition of a strong or equitable local and regional food system.*
Variables:

i. Income and Race (Source: *American Community Survey 5-year estimates*)

We used these variables to create synthetic households by calculating the county's weighted centroid by non-white and 100% below the poverty line characteristics at the census tract level.

ii. Point data of retailers of locally sourced fruits, vegetables, and meats, and food hubs (Source: *USDA Local Food Portal*)

We used the point data to generate the distance of each synthetic household from the nearest local food retailers and food hub.

iii. Non-commercial local food sources (Local public hunting areas, Source: *Fish and Wildlife Service*; Local water resources, Source: *National Hydrography Dataset*)

We used these data to generate the distance of the households from the centroid of local public hunting areas and water sources' edges.

iv. Capacity variables (Supercenters and club stores per 1,000 population, Grocery stores per 1,000 population, Convenience stores per 1,000 population, Fast-food restaurants per 1,000 population, Source: ***Local Food Data Warehouse***)

v. Sociodemographic variables (Food insecurity rate, Percentage of households with no car and low access to a store, Percent of population 18 to 24 years, enrolled in college or graduate school, Source: ***Local Food Data Warehouse*****)**

Why? We created an underrepresented household using the income and race census variables to address equity. The distances from the household to commercial and non-commercial food sources measure access to regional food sources. The capacity variables indicate the strength of a specific county to provide food at home and away from home to its residents. The sociodemographic variables provide basic household food insecurity indicators.
Description: To calculate the index, we grouped the variables into three categories: 1) Food Quality (i.e., distances calculated from ii. and iii.); 2) Food Quantity (i.e., Capacity variables from iv.); and 3) Sociodemographic characteristics (from v.). The index is the weighted sum of each category using the following weights: 2.5/8 for the Food Quality variables, 2.5/8 for the Food Quantity variables, and 3/8 for the Sociodemographic Characteristics. We assigned a larger weight to the characteristics' variables to capture the inequity in food access demographically.

Section 3: *Explain how your index is presented in your data visualization.*
The index represents food access inequity in the United States using measures of regional food accessibility and sociodemographic characteristics. The index spans from 0 or high local food access and 100 or no local food access. The index is used to compare and visualize local food access across different counties of the United States. In our visual, the highest food inequity index values are represented by heavily shaded counties.
Conclusion: The current status of local food access inequity in the U.S. is mainly driven by poverty and other social inequities. The U.S. is a country with accessible natural resources, and our index demonstrates that future policies can leverage these resources to alleviate food insecurity.