Food System Strength

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Section 1: *Define and justify what makes a strong or equitable local and regional food system.*

It is commonly said that "a chain is only as strong as its weakest link." In applying that notion to Food Systems, we equate a strong food system with one that is equitable. That is, we define a strong food system as one in which food is accessible and affordable to every person, or, in a more reasonable sense, to the largest number of people possible.

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.*

To define a strong food system, we collected county-level data within all four components of the food system: production, processing, distribution, and consumption of food, in order to evaluate strength among each of these aspects of the food system. When creating the index, however, we condensed the components of the food system into only 2 categories: Production and Processing, and Distribution and Consumption.

Variables relating to production include annual average counts of food production facilities as well as the percentage of farmland acres designated as prime farmland. Variables relating to processing include annual average counts of manufacturing and warehousing establishments, as well as the number of meat processors per capita. Variables relating to distribution include annual average counts for stores, food services, wholesalers, and truck transportation establishments per capita. Variables relating to consumption include food insecurity rates for individuals and children, number of households receiving SNAP benefits, and cost-per-meal.

Section 3: *Explain how your index is presented in your data visualization.*

To create our index, we calculated the 25th, 50th, and 75th percentiles for each variable individually and applied a point system where whole number values 1-4 were given to each variable according to which quartile it falls within. For positive indicators of food system strength, such as those relating to production and processing capabilities, 1 corresponds to the lowest quartile and 4 corresponds to the highest quartile. For negative indicators of food system strength, such as cost per meal and food insecurity rates, 1 corresponds to the highest quartile and 4 to the lowest. The index scores for each variable were summed within each category and then divided by the total number of variables in that category in order to maintain the 1-4 scale.

The index is presented as a bivariate choropleth map of the Appalachian region with the indexed combination of production and processing on one axis and distribution and consumption on the other. This depiction is intended to show how strong production and processing capabilities may influence distribution and consumption capabilities, and thus, food accessibility and equity. The color combinations and depictions in the map show how these different aspects of the food system appear and interact with one another in different areas.

The visualization of our index is consistent with patterns you would expect across the United States and in the Appalachian Region. For example, the midwest and some southern regions of the U.S. appear more orange on the map, indicating higher levels of production and processing and lower levels of distribution and consumption. Within the Appalachian region, counties in the wealthier states show colors indicative of strength in both categories, whereas others depict more consistently a lack of strength in one or both categories.