

**State Level Food System Indicators: Measuring Structure, Performance & Change**

**What is a Food System?**
We define the food system as the set of activities required to feed a population. These include: input supply, agricultural production, processing, distribution and wholesaling, retailing, consumption, and waste disposal. This study is unique because it focuses on all aspects of the food system rather than focusing more narrowly on agricultural production or on consumption.

**Phase I – Data Collection.** Indicators should be: measurable, relevant, related to important trends and impacts, sensitive/responsive to changes over time, hierarchical, and the basis for learning. Ideally, measures for these indicators should be: valid and reliable, timely, collected and reported regularly and consistently, publicly available, and transparent.

To date, we have concentrated data collection efforts on U.S. Government data published online by a number of agencies. We are using our definition of a food system and our indicator types as a guide in this effort.

Often we have multiple indicators for a food system activity – indicator type combination, and for some combinations, we have not yet identified appropriate indicators for which data are available. The indicators to the lower right are illustrative of those for which we have collected data.

**Phase II – Data Reduction.** We are collecting data for a large number of indicators – too many for use in meaningful comparisons over space and time. The second phase of our project will involve the use of principal components analysis (PCA) as a data reduction tool to cluster indicator measures into groups that can be categorized.

We will be using both exploratory and confirmatory analysis. In an exploratory mode, we will be testing different sets of indicators within the PCA to see what factors emerge. For example, we may do a PCA with all the indicators related to a single food system activity, such as agricultural production, and another PCA with all indicators related to a single indicator type, such as health. In a confirmatory mode, we will use PCA to assess the validity of alternative grouping concepts, such as the "healthy, fair, green, and affordable" performance dimensions central to the Wallace Center’s study.

**Background.** Today’s food system is complex and multifaceted. It affects human health, the environment, and the economy. It is also closely linked to culture and our sense of community. Sound food policy formation requires a robust understanding of the current food system status as well as the linkages between policy initiatives and changes in the food system.

This study is developing a set of state-level food system indicators and collecting data on them for all 50 states for the period 1997 – 2007. The indicators are both descriptive and evaluative. As descriptive measures, they will help users understand how the food system differs across states or regions, as well as how it is changing over time in a single location. As evaluative measures, they will help users assess how food system performance differs over space and time. We draw heavily on the Wallace Center’s “Charting Growth to Good Food” report to identify food system indicators.

### Food System Activities

<table>
<thead>
<tr>
<th>Indicator Type</th>
<th>Input Supply</th>
<th>Agricultural Production</th>
<th>Processing</th>
<th>Distribution &amp; Wholesaling</th>
<th>Retailing</th>
<th>Consumption</th>
<th>Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive</td>
<td>Number of Input Suppliers</td>
<td>Farm Size</td>
<td>Number of Food Manufacturing Companies</td>
<td>Number of Food Distributors</td>
<td>Number of Food Stores per 10,000 people</td>
<td>Average Per Capita Intake of Fruits and Vegetables</td>
<td>Food Waste as a Percent of Total Disappearance</td>
</tr>
<tr>
<td>Economic</td>
<td>Total Input Expenses or Purchases Per Farm</td>
<td>Net Farm Income</td>
<td>Value Added by Food Manufacturing Companies</td>
<td>Value Added by Food Distributors</td>
<td>Average Wage Rate Per Employee</td>
<td>Food Insecurity</td>
<td>Average Cost of Household Waste Disposal</td>
</tr>
<tr>
<td>Environmental</td>
<td>Conservation Program Enrollment</td>
<td>Value of Organic Retail Sales</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td>Worker Injuries</td>
<td>Pesticide Exposure</td>
<td>Number of Food Safety Recalls</td>
<td>Worker Injuries</td>
<td>Number of Food Safety Recalls</td>
<td>Prevalence of Diabetes in Children Under 18</td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Average Age of Principal Farm Operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Political</td>
<td>Federal Funding for Land Grant Research</td>
<td></td>
<td></td>
<td>Number of School Districts Prohibiting the Sale of Junk Food in Schools</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Indicators listed are examples. Additional indicators have been identified for each food system activity and performance type. Stars represent indicator pairs for which data is showing promising potential.

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**Image References:** Between 1993 and 2007, food manufacturing's share of GDP declined in all but six states. This means other parts of the economy were growing faster than food manufacturing.

Between 1997 and 2007 the percentage of farmland in conservation programs increased in 34 states. The largest increases were growing faster than food manufacturing.

Over the past decade, food insecurity has increased in more than half of the states. Iowa had the largest proportional increase, implying an increase in store size and, perhaps, a decrease in easy access to stores for some consumers.

Between 1998 and 2007 the number of grocery stores per 10,000 people decreased in all states except New York. This implies an increase in store size and perhaps a decrease in easy access to stores in areas consuming the healthy, fair, green, and affordable performance dimensions central to the Wallace Center’s study.

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