Regional Food Systems: A View from the Northeast

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Tufts University
• Dueling Food Systems (Myth or Reality?)
• Trends in the Northeast U.S.
• Setting the Baseline, Considering the Future
• Challenge of Interdisciplinary work
How many food systems do we have?

How many do we need...?
Relationships & markets
Direct to Consumer Sale of Food: Top 10 States

Food Systems Scales

• “The Industrial”
  – An assumption about scale (large)
  – Producing both feedstocks and foods
  – Provides a large portion of US food supply
  – Also conflated with many other characteristics
Food Systems Scales

• “The Global”
  – The Corporate Food System
  – Viewed mostly from farm gate outward
  – Players might be large, small, local, etc.
Food Systems Scales

• “The Local”
  – Tremendous interest
  – Northeast leads in direct to consumer
  – Rapid growth, from a small starting point
  – Conflated with scale, method of production, and nutrition
Food Systems Scales

• “The Regional”
  – Scale is variable (depends on who you ask)
  – More dependent on supply chains that Local
  – Potentially shorter supply chains than Industrial
Scales Overlap, and they should Communicate and Compliment
Share of the food system?

Impact on food security?
(Household and regional)
Interest in Northeast despite long-term agricultural challenges:

<table>
<thead>
<tr>
<th></th>
<th>1925</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Farms</td>
<td>50,033</td>
<td>8,136</td>
</tr>
<tr>
<td>Land in Farms</td>
<td>5.16 million acres</td>
<td>1.34 million acres</td>
</tr>
<tr>
<td>Cropland</td>
<td>1.64 million acres</td>
<td>0.53 million acres</td>
</tr>
</tbody>
</table>
Comparative Advantage to Achieve Low Food Cost

Specialization

Economies of Scale

Input/Output Efficiency
Nearly Complete Externalization of Non-Production Costs

Environmental Degradation

Health Impacts (direct and indirect)

Economic Opportunity
Getting back to Regional…

- Maine to West Virginia
- Supply chains
- Farms are the start
- Consumers are the end
Enhancing the Food Security of Underserved Populations in the Northeast U.S. through Sustainable Regional Food Systems (EFSNE)

Funded by USDA/NIFA (Global Food Security Program)
Prepared for the March 26, 2013 PD Meeting, Washington, DC

Grant No. 2011-68004-30057
Northeast Project Sites and Collaborating Institutions

- Rural Study Sites (DE, NY and VT)
- Metro Study Sites

Metro Study Sites:
- Charleston
- Pittsburgh
- Syracuse
- New York
- Philadelphia
- Baltimore

Rural Study Sites:
- USDA
- Penn State
- Columbia University
- NESAWG
- Tufts University
- USDA

Institutions:
- USDA
- Columbia University
- Tufts University
- NESAWG
- USDA
Supply Chains

Processing/Distribution

Access in Communities

Farm-level Production
Some Details

- Estimation conducted at state level
  - NASS Survey date
  - Census of Agriculture
  - Experiment station research and Depts. of Ag
  - Extension experts
- Some aggregation to larger areas
- **Goal**: 10-yr time-series of *Output*
- Data Gaps are a significant issue, especially for Fruit and Vegetable crops
## Land and Land Use in NE

<table>
<thead>
<tr>
<th>Description</th>
<th>Northeast</th>
<th>U.S.</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land in Farms</td>
<td>27.5</td>
<td>922.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Cropland</td>
<td>12.1</td>
<td>309.6</td>
<td>3.9</td>
</tr>
</tbody>
</table>
Northeast regional mean agricultural land area, 2001-2010

Forages and field and grass seeds (animal feed)

Other land in farms (not in production)

Field crops (animal feed)

Pasture land (grazed)

Grains

Vegetables

Protein foods

Oils

Non-food cropland

Fruit

Food crops grown in nurseries

% of total agricultural land in the Northeast

0 19 37
Crop Diversity in the Northeast

More than 300 different crops grown
(includes feed, food, non-food, “other”)

Cumulative Cropland Area (% of Total)

Number of Crops

Corn (grain)
Corn (silage)
Soybean
Wheat
<table>
<thead>
<tr>
<th>Category</th>
<th>Regional Self-Reliance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td>8</td>
</tr>
<tr>
<td>Proteins</td>
<td>8</td>
</tr>
<tr>
<td>Vegetables</td>
<td>26</td>
</tr>
<tr>
<td>Fruit</td>
<td>18</td>
</tr>
</tbody>
</table>

Reliance = (regional production / regional consumption) * 100
<table>
<thead>
<tr>
<th>Vegetable Group</th>
<th>Regional Self-Reliance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dark Green</td>
<td>11</td>
</tr>
<tr>
<td>Starchy</td>
<td>33</td>
</tr>
<tr>
<td>Red and Orange</td>
<td>13</td>
</tr>
<tr>
<td>Other</td>
<td>33</td>
</tr>
<tr>
<td>Fruit Group</td>
<td>Regional Self-Reliance (%)</td>
</tr>
<tr>
<td>------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>“Commonly Eaten”</td>
<td>17</td>
</tr>
<tr>
<td>Berries</td>
<td>13</td>
</tr>
<tr>
<td>Melons</td>
<td>13</td>
</tr>
</tbody>
</table>
Northeast Regional Production from Meat Animals (mean, 2001-2010)

On a fluid milk equivalent basis, the region is about 75% self-reliant for dairy.

- **Seafood**: 448 million pounds produced
- **Beef**: 664 million pounds produced, 16%
- **Pork**: 891 million pounds produced, 15%
- **Chicken**: 1,478 million pounds produced, 29%

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On a fluid milk equivalent basis, the region is about 75% self-reliant for dairy.
Fluid milk is a regional product; Other dairy products are not (necessarily)

On a fluid milk equivalent basis, the region is about 75% self reliant
Clustering of higher or lower yields and stability of yields over time
Geospatial Crop Modeling

- Current production
- Production Scenarios
  - Water use
  - Land use change
  - Climate change
- Questions:
  - How much land?
  - Highest potential yield?
  - Production constraints?
  - Resource needs?

- Results aggregated to the county-level
- Three crops to be simulated (potatoes, corn, wheat)
- Water-limited (WL) and non-limited (NL) scenarios

Fleisher and Resop, USDA-ARS, CSGCL, Beltsville, MD
Cropping System Linkages

USDA-NASS, Cropland Data Layer
3-year Production Footprints

2007 Census of Agriculture
2008-2010
Urban & Peri-Urban Agriculture Assessment
Subsequent Questions:

If we are to grow more food within the region, *where* would that occur?

How would such shifts be impacted by drivers like climate change, dietary shifts, etc.?

How are production and consumption changes likely to be affected by policy??
How does this type of work get done?
The Ideal...
PROD Team Meetings
Keeping in Touch

Data sharing and file versioning are very real challenges.

Our PROD group has had a conference call every 2nd Friday since March 2010.
1. Student interest and engagement greater than anticipated
2. Work at community level requires substantial effort-uneven results
3. Adaptive management is key to daily problem solving
4. Teams learning to utilize new methods from unrelated disciplines
Average density 2006: 1.75

Legend
1: if knew of this individual in 2006
2: if ever cited this person's published work
3: if had working relationship with (in local or regional foods)

Note colors represent k-cores
Average density
2006: 1.75
2010: 10.94
2012: 18.29*

*t-stat: (9.92) 2012/2006

Legend
Line colors show intensity of interaction
Node colors represent k-cores
Thanks!