Agriculture and Employment in the Rural Midwest:

Exploring the Prospects and Practical Limits of Local Food Production Initiatives

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The Primary Organizing Premise to My Work on This Topic is:

What if?
Not
What is?

Upper Midwest Study

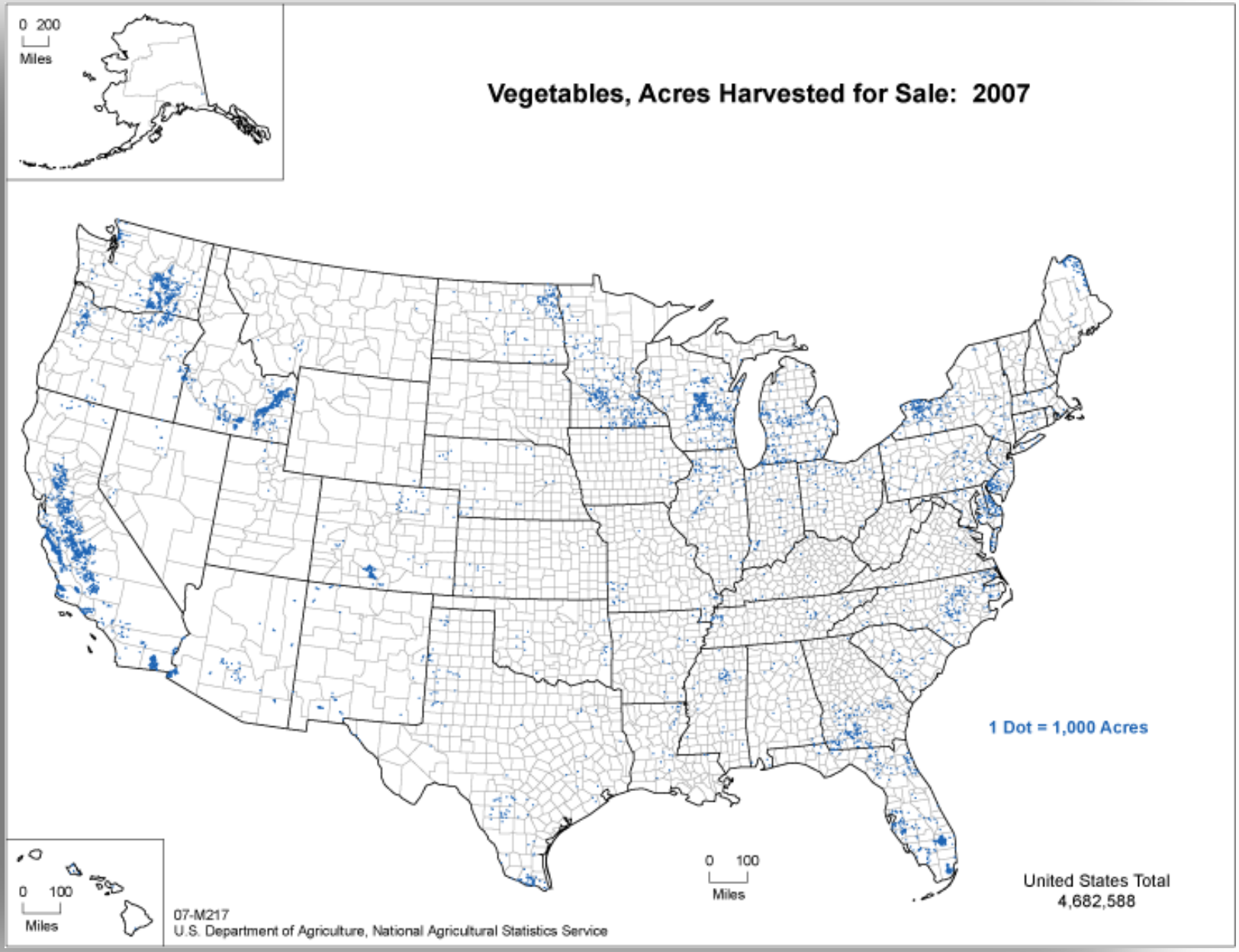
- Iowa, Illinois, Indiana, Minnesota, Michigan, Wisconsin
- Two scenarios involving 28 fresh fruits and vegetables:

  Scenario 1: Each state feeds itself only (about which I am not going to elaborate)

  Scenario 2: Given metropolitan markets of 250,000 or more, producers work to satisfy major metropolitan demand

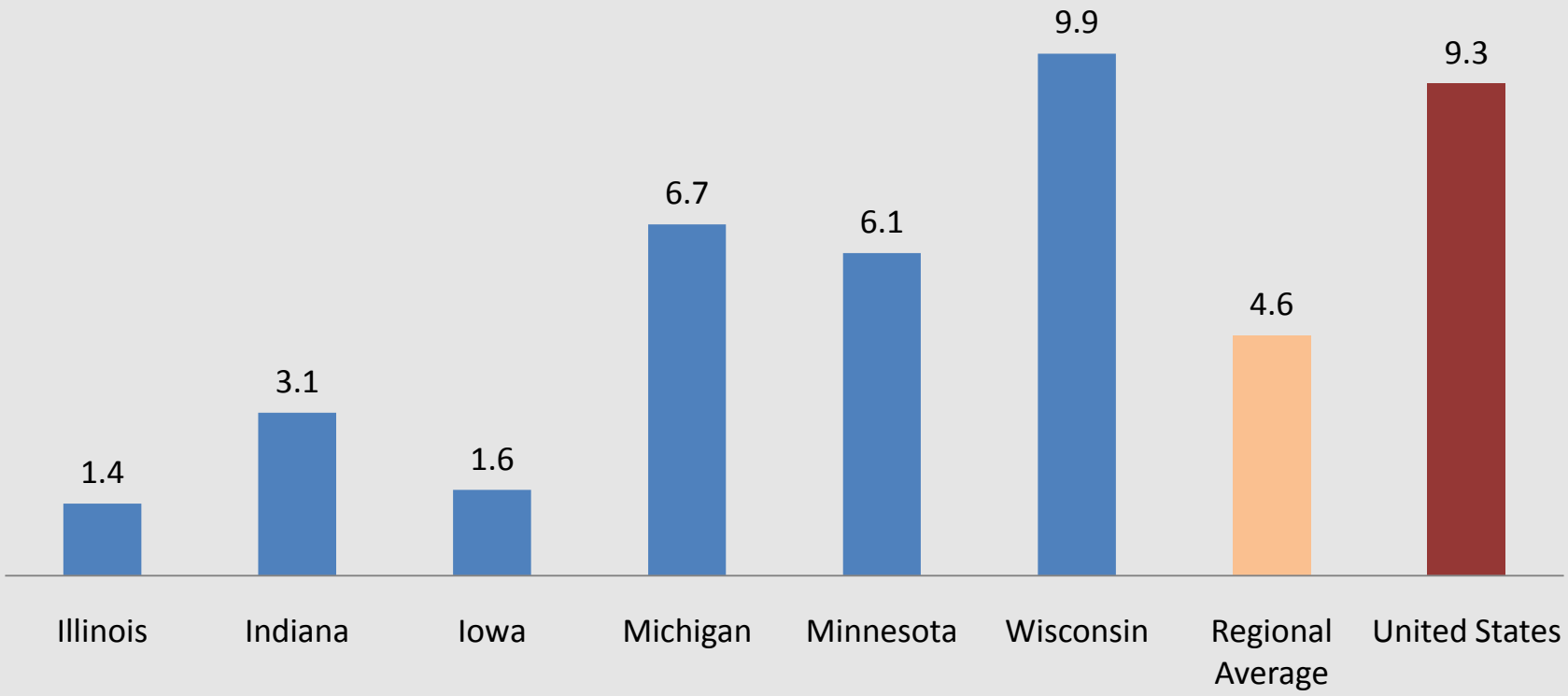
Purpose

- Demonstrate reasonable methods and assumptions for projecting farm production, income, and job values of fresh fruit and vegetable production for local markets.
- Demonstrate the values and the variances across the states.
- Demonstrate the potential dynamics of a system based on urban demand and a rationally distributed production system.

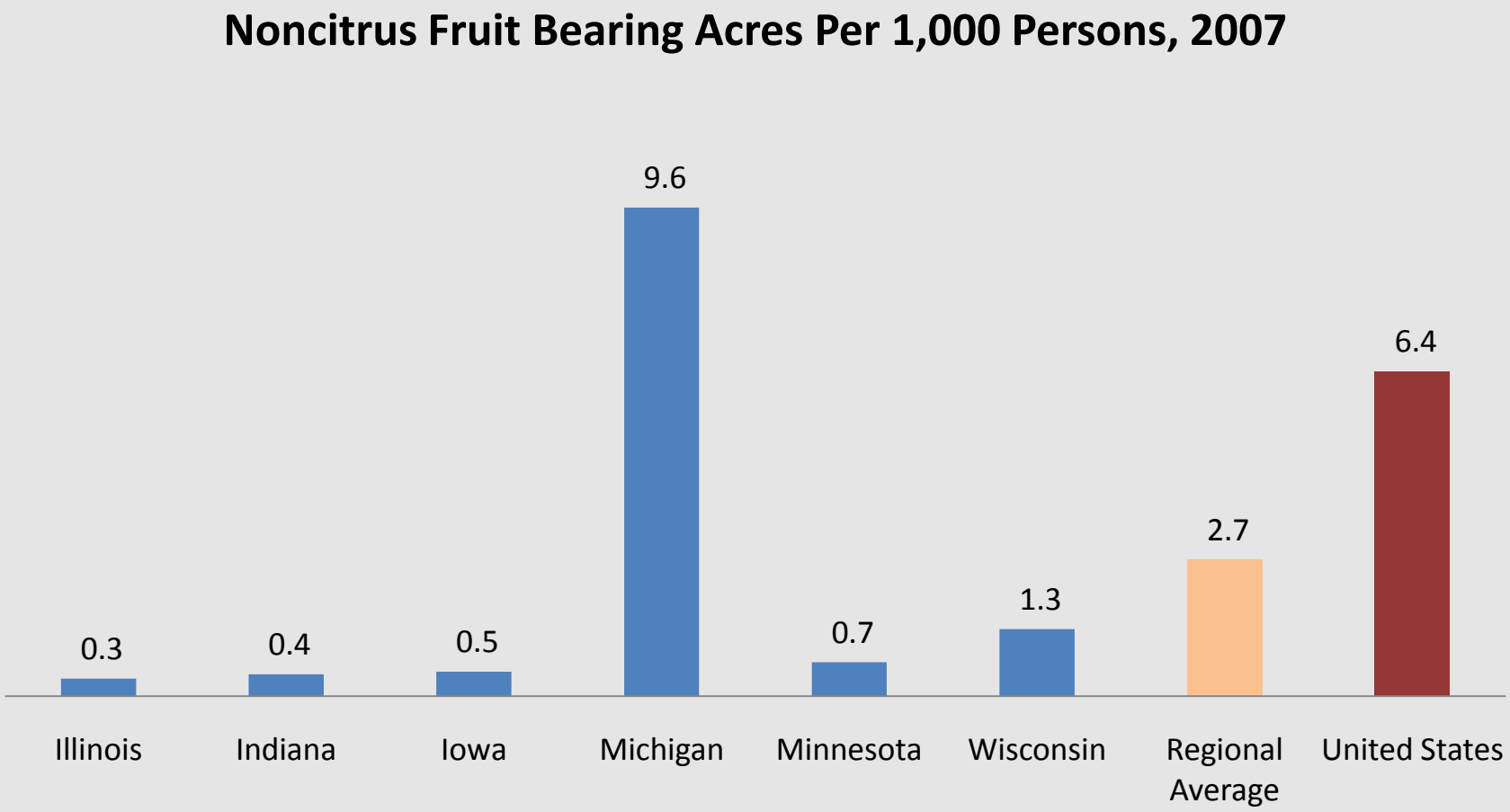

Vegetables, Acres Harvested for Sale: 2007
0 200
Miles
1 Dot = 1,000 Acres
0 100
Miles
0 100
Miles
United States Total
4,682,588
07-M217
U.S. Department of Agriculture, National Agricultural Statistics Service

Wide Variances in Vegetable Production

Fresh Vegetable Acres Per 1,000 Persons, 2007



Wide Variances in Fruit Production



Steps

- Demand for all vegetables and fruits is a function of farm weights, retail weights, and population.
- Supply begins with yield estimates per acre
  - The values are indexed to the Iowa estimates
  - Used a weighted formula based in the variances in grain crop yields across the states.
  - Gives statewide averages that are not within-state variable
  - No explicit accounting of climate
  - No adjustments for farming practices (irrigation, etc.)

Local Supply Potential Weights Per Crop

Apples	50%	Lima Beans	25%
Apricots	25%	Mustard Greens	25%
Asparagus	50%	Okra	25%
Bell Peppers	50%	Onions	50%
Blueberries	25%	Peaches	50%
Broccoli	25%	Pears	50%
Cabbage	25%	Plums	50%
Cantaloupe	50%	Potatoes	50%
Carrots	25%	Pumpkin	50%
Cauliflower	25%	Radishes	50%
Cherries	50%	Raspberries	50%
Collard Greens	50%	Snap Beans	50%
Cucumbers	25%	Spinach	25%
Eggplant	50%	Squash	50%
Garlic	50%	Strawberries	50%
Grapes	25%	Sweet Corn	50%
Kale	25%	Sweet Potatoes	25%
Lettuce (Head)	25%	Tomatoes	50%
Lettuce (Leaf)	25%	Watermelon	50%

Limiting the Analysis

- Excluded crops that are not suitable for this climate
- Excluded crops that we already produce in excess of combined regional demand
- Excluded crops for which there were no or highly irregular price information

Candidate Crops

Fruit and Fresh Vegetables Analyzed	
Apricots	Lettuce (Leaf)
Asparagus	Mustard Greens
Bell Peppers	Onions
Broccoli	Peaches
Cabbage	Pears
Cantaloupe	Plums
Carrots	Raspberries
Cauliflower	Snap Beans
(Collard) Greens	Spinach
Cucumbers	Squash
Eggplant	Strawberries
Garlic	Sweet Potatoes
Kale	Tomatoes
Lettuce (Head)	Watermelon

Scenario 1

State Only Analysis: Circumscribes all production and demand within state boundaries.

- Allows for a parochial determination
- May be more amenable to policy advocacy
- Considers all state demand

Scenario 2

Allocates production relative to dense populations

- Begins with metros of 250,000 or more as demand centers
- Disregards state boundaries
- Allows estimates for nearby or bordering metros
- Algebraic weighting considering both a propensity to produce (small farms) and the capacity to produce (crop land), in lieu of …
- The disincentives of distance – gravity
- Provides county level estimates (that can then be summed back to the state level)

Impact Analysis: Three Components

- Fruit and vegetable production value of the 28 crops. These are the values that accumulate to the farmers.
- Conventional farming offset – available farm land is assumed to be fixed: The offset was the acres required and the current value of that production were it to produce corn and soybeans.
- Selected economic estimates for fresh fruit and vegetable retailing were 50 percent sold by farmer-retailers.

Scenario 1

	Acres Required	Farm Value	Retail Value
Illinois	69,387	263,950,324	988,696,097
Indiana	39,709	130,461,426	488,677,950
Iowa	16,215	61,428,632	230,097,269
Michigan	75,192	204,657,875	766,600,472
Minnesota	34,541	106,802,906	400,058,674
Wisconsin	34,982	115,141,376	431,292,628
Region Total	270,025	$882,442,539	$3,305,423,091

Example Farm Level Impacts

Combined State Farm-Level Economic Values of Fruit and Vegetable Production

	Direct	Indirect	Induced	Total
Output	882,442,547	275,234,526	264,330,275	1,422,007,351
Value Added	426,705,830	142,748,445	150,401,704	719,855,976
Labor Income	**231,390,262**	**81,968,002**	**81,761,366**	**395,119,624**
Jobs	**5,196**	**1,969**	**2,137**	**9,302**

Combined State Farm-Level Economic Values of Corn and Soybean Production

	Direct	Indirect	Induced	Total
Output	305,624,656	91,053,116	40,514,882	437,192,649
Value Added	137,207,498	46,929,842	23,021,443	207,158,785
Labor Income	**24,229,186**	**22,477,872**	**12,409,984**	**59,117,038**
Jobs	**1,763**	**494**	**320**	**2,578**

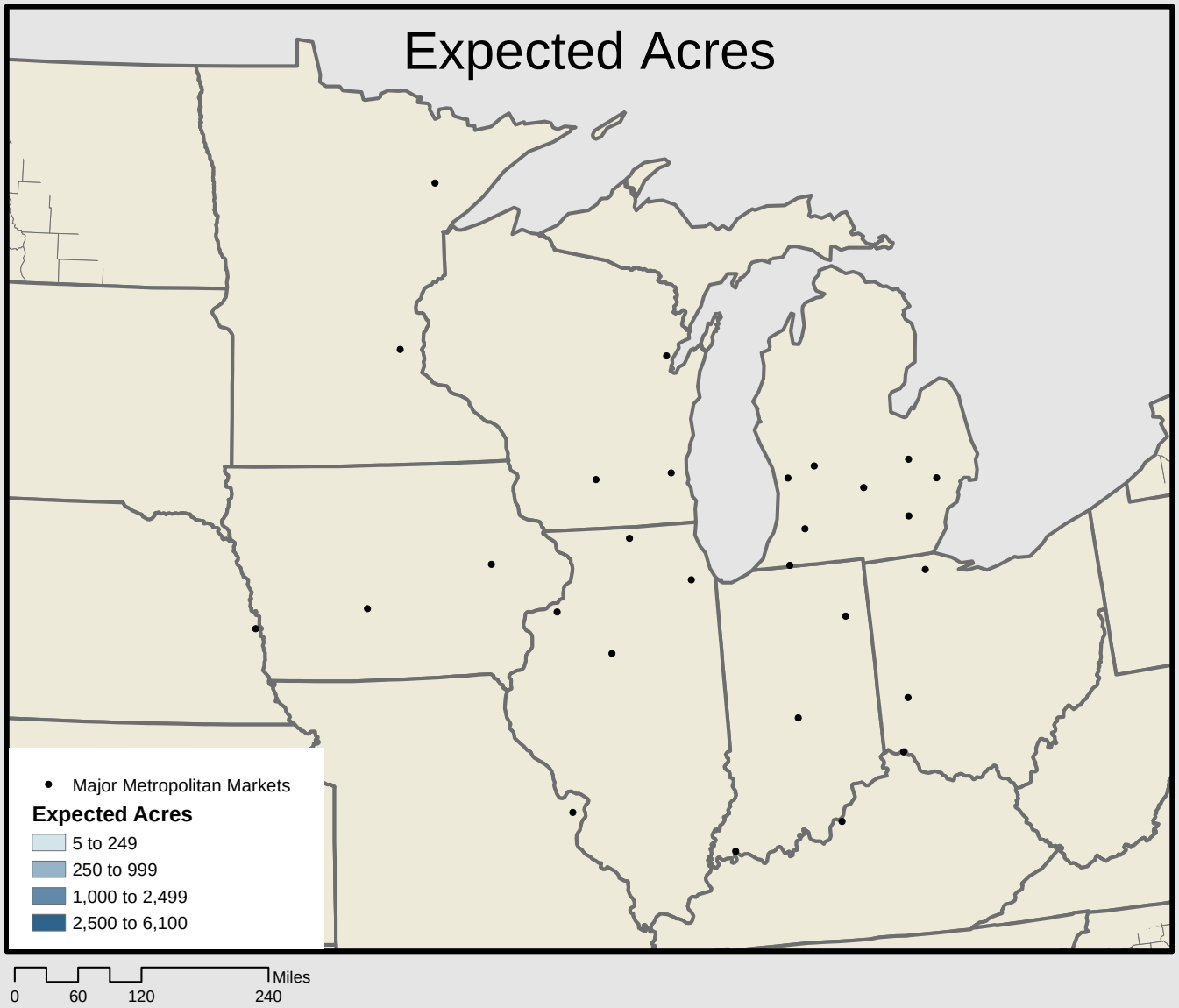
Retail Sales Requirements

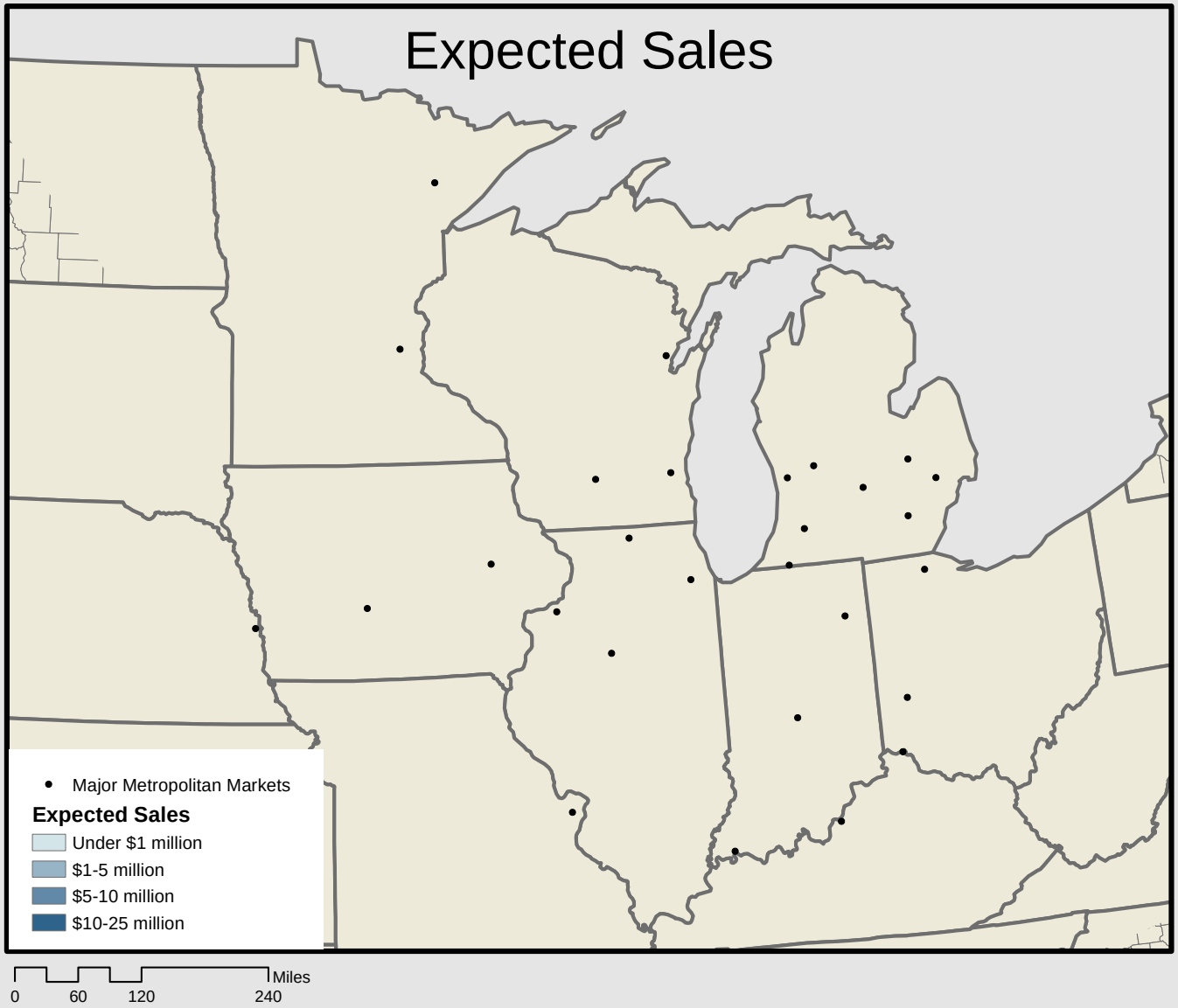
Business Establishments and Jobs Required to Directly Market 50 Percent of Fruit and Vegetable Production

	Retail Sales	Fruit and Vegetable Establishments	Jobs
Illinois	494,348,049	420	2,887
Indiana	244,338,975	208	1,427
Iowa	115,048,635	98	672
Michigan	383,300,236	326	2,238
Minnesota	200,029,337	170	1,168
Wisconsin	215,646,314	183	1,259
Region Total	$1,652,711,546	1,405	9,652

Scenario 2 – Demand Density Driven Production

Metropolitan Area	2008 Population	Metropolitan Area	2008 Population
Ann Arbor, MI	347,969	Holland-Grand Haven, MI	258,461
Cedar Rapids, IA	252,472	Indianapolis, IN	1,692,737
Chicago-Naperville-Joliet, IL-IN-WI	9,496,853	Kalamazoo-Portage, MI	322,340
Cincinnati-Middletown, OH-KY-IN	2,143,824	Lansing-East Lansing, MI	455,071
Davenport-Moline-Rock Island, IA-IL	375,638	Louisville, KY-IN	1,232,304
Dayton, OH	838,828	Madison, WI	554,267
Des Moines, IA	545,669	Milwaukee-Waukesha-West Allis, WI	1,543,378
Detroit-Warren-Livonia, MI	4,457,523	Minneapolis-St. Paul-Bloomington, MN-WI	3,197,620
Duluth, MN-WI	273,757	Omaha-Council Bluffs, NE-IA	827,666
Evansville, IN-KY	349,723	Peoria, IL	370,793
Flint, MI	434,027	Rockford, IL	351,260
Fort Wayne, IN	409,177	South Bend-Mishawaka, IN-MI	316,233
Grand Rapids-Wyoming, MI	774,931	St. Louis, MO-IL	2,805,465
Green Bay, WI	301,056	Toledo, OH	650,770
		Total Population	35,579,812


Expected Acres
Major Metropolitan Markets
Expected Acres
5 to 249
250 to 999
1,000 to 2,499
2,500 to 6,100
0
60
120
240
Miles


Expected Sales
Major Metropolitan Markets
Expected Sales
Under $1 million
$1-5 million
$5-10 million
$10-25 million
0
60
120
240
Miles

Scenario 2: Direct Outcomes

Production Outcomes for the Metropolitan Markets

Acres Required	195,669
Farm Value	$637,441,980
Potential Retail Value	$2,387,730,169

Distribution of Counties by Acres and Total Farm-Level Sales

Acres	Counties	Sales	Counties
None	54	None	54
1 to 249	283	Under $ 1 M	306
250 to 999	141	$1M to 4.999 M	158
1,000 to 2,499	54	$5 M to $9.999 M	15
2,500 or more	2	$10 M or more	2

Farm Sales and Acreage Requirements to Selected Metropolitan Areas by State

	Farm Sales	Acres
Illinois	188,664,354	49,596
Indiana	130,774,296	39,804
Iowa	34,048,702	8,987
Michigan	155,960,538	57,300
Minnesota	55,875,658	18,071
Wisconsin	72,118,432	21,911
Region	$637,441,980	195,669

Farm Level Impacts

Farm-Level Total Economic Values For Selected Metropolitan Fruit and Vegetable Sales

	Output	Value Added	Labor Income	Jobs
Illinois	311,380,666	158,206,856	86,148,983	1,859
Indiana	212,036,639	104,534,003	56,352,764	1,349
Iowa	53,796,912	26,721,816	14,591,221	364
Michigan	245,422,881	125,592,122	69,006,449	1,684
Minnesota	90,201,314	46,330,066	25,681,435	610
Wisconsin	114,819,526	58,036,689	32,826,190	828
Region	$1,027,657,939	$519,421,553	$284,607,041	6,694

Conventional Farming Offsets

Farm-Level Total Economic Values of Corn and Soybean Production on Land That Would be Required for Fruit and Vegetable Sales to Selected Metropolitan Areas

Ratios	Output	Value Added	Labor Income	Jobs
Illinois	90,005,838	43,170,903	12,272,366	454
Indiana	67,498,493	31,828,678	7,910,632	446
Iowa	15,480,487	7,021,749	2,264,437	72
Michigan	85,803,963	40,657,236	11,775,884	548
Minnesota	28,921,120	13,981,724	4,076,668	176
Wisconsin	30,144,690	13,944,100	4,212,337	196
Region	$317,854,591	$150,604,390	$42,512,324	1,892

Retail

Location of Retail Sales	Retail Sales
Illinois	391,583,716
Indiana	99,362,877
Iowa	44,978,664
Michigan	270,165,054
Minnesota	133,021,549
Wisconsin	91,917,105
Out of Region	162,836,120
Regional Total	$1,193,865,085

Cautions / Concerns

- Crop yield assumptions affect the corn and soybean offsets
- Are the gravity assumptions too severe – is the 150 mile limit on Scenario 2 too restrictive – I don't think so?
- 2008 prices – 2008 was an odd year.
- No net economic impact summaries until a clear-cut determination of realistic state production

Last, and this is important,

There are reasons why there are comparative deficits in fresh fruit and vegetable production in many of the states.

Those reasons cannot be assumed away by hype, policy, politics, or fads.

The market-influencing fundamentals of land productivity, climate (however changing), energy costs, and settlement patterns cannot be altered to the degrees that many presume, especially in the short run.

Gains, should gains accumulate, will likely occur on the profitable margins … as those margins reveal themselves in the market.

Thank you

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The original report:

http://www.leopold.iastate.edu/research/marketing_files/midwest.html