# Selected Measures of the Economic Values of Increased Fruit and Vegetable Production and Consumption in the Upper Midwest

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## Executive Summary

This research considers the potential statewide and regional economic values that might accumulate to farmers and regional economies if there was an increase in the production of 28 types of fresh fruits and vegetables for local consumption. The states studied were Illinois, Indiana, Iowa, Michigan, Minnesota, and Wisconsin.

Two separate analyses were conducted. The first provides state-only estimates where the economic values are compiled considering each state's farmers and each state's consumption as a distinct and closed study area. The second analysis evaluates individual counties within the six-state region considering both their capacity and potential to produce fresh fruits or vegetables to serve medium to large metropolitan regional markets with populations in excess of 250,000 persons. This second analysis is indifferent to state boundaries.

Both research scenarios also presuppose that 50 percent of the local fruit and vegetable production will be marketed via producer-owned fruit and vegetable stores. The economic values of those activities also are partially estimated.

These are the relevant findings:

*Under the first scenario:*

- 270,025 cropland acres would be needed to produce the partial-year demands of 28 fresh fruits and vegetables in the six-state region. That is roughly equivalent to the average amount of cropland in one of Iowa's 99 counties. Those acres would produce $882.44 million in farm-level sales, which would be worth $3.31 billion when sold at retail.
- Considering all industrial linkages, farm-level production would result in 9,302 total jobs region-wide, earning a total of $395.12 million in labor incomes.
- The land required to produce those fruits and vegetables would have to come from conventional agriculture as the amount of cropland is fixed. Considering all industrial linkages, corn and soybean production on those same acres supported 2,578 jobs and $59.12 million in labor incomes.
- If 50 percent of that production were sold via producer-owned markets, the region would need a total of 1,405 establishments staffed by 9,652 jobs earning $287.64 million in labor incomes.

*Under the second scenario:*

- The 28 metropolitan markets would require 195,669 fruit and vegetable acres to produce $637.44 million in farm-level sales.
- Considering all relevant multipliers, that farm-level production would support 6,694 jobs and $284.61 million in labor income in the six-state area.
- The land required to produce those fruits and vegetables would have to come from conventional agriculture as the amount of cropland is fixed. Considering all industrial

linkages, corn and soybean production on those same acres supported 1,892 jobs and $42.517 million in labor incomes.

- It would take 875 fruit and vegetable markets to distribute these crops using the producer-retailers in the metropolitan areas that are actually within the region, which would in turn support 6,021 jobs in those establishments earning $180.7 million in labor incomes.

This research provides two estimates of the farm-level and economy-wide levels of increased fruits and vegetable production to satisfy local demand. Each scenario is to be considered separately – **the two scenarios must not be combined**. Each state can easily identify unique state amounts under each scenario to ascertain, given the assumptions used in this assessment, the potential value of this type of production in terms of job and labor income growth.

It is important to note that this research was not intended to isolate all of the net new production to the states or region; instead, it identifies the total value of production given the scenarios employed. Additional research is needed to discern the state-by-state and regional productivity gains that would accrue after accounting for existing production.

This research was funded primarily by a grant from the Leopold Center for Sustainable Agriculture at Iowa State University. The following organizations provided funds to purchase state-level data sets: Illinois Fresh Taste Initiative, the Institute for Agriculture and Trade Policy, the Minnesota Institute for Sustainable Agriculture, the Land Stewardship Project, the Center for Integrated Agricultural Systems – University of Wisconsin, the Michael Fields Agricultural Institute, Indiana Cooperative Development Services, the Michigan Food and Farming Systems, and the C.S. Mott Group for Sustainable Food Systems at Michigan State University.

**SCENARIO ONE: To expand production of 28 fruit/vegetables in six states to meet seasonal demand, direct-marketing 50 percent via producer-owned stores**

| | Acres needed | Farm-level sales ($ million) | Retail value: crops ($ million) | Farm-level total jobs: fruit/vegetable production | Farm-level total labor income ($ million) | Direct-market stores | Retail-level jobs | Retail-level labor income ($ million) | Farm-level total jobs: corn–SB production[1] |
|---|---|---|---|---|---|---|---|---|---|
| Illinois | 69,387 | 263.9 | 988.6 | 2,600 | 120.5 | 420 | 2,887 | 91.1 | 635 |
| Indiana | 39,709 | 130.4 | 488.6 | 1,345 | 56.2 | 208 | 1,427 | 46.0 | 445 |
| Iowa | 16,215 | 61.4 | 230.0 | 657 | 26.3 | 98 | 672 | 17.1 | 131 |
| Michigan | 75,192 | 204.6 | 766.6 | 2,210 | 90.5 | 326 | 2,238 | 63.9 | 719 |
| Minnesota | 34,541 | 106.8 | 400.0 | 1,166 | 49.0 | 170 | 1,168 | 35.2 | 336 |
| Wisconsin | 34,982 | 115.1 | 431.1 | 1,322 | 52.4 | 183 | 1,259 | 34.2 | 313 |
| **Region total** | **270,025** | **$882.4** | **$3,305.4** | **9,032** | **395.1** | **1,405** | **9,652** | **287.6** | **2,578** |

*1. Based on the number of corn-soybean acres offset by conversion to fruit/vegetable production.*

**SCENARIO TWO: To expand production of selected fresh produce for 28 metropolitan markets[1] in the six-state region, direct-marketing 50 percent via producer-owned stores**

| | Acres needed | Farm-level sales ($ million) | Farm-level total jobs: fruit/vegetable production | Retail-level jobs | Farm-level total jobs: corn–SB production[2] |
|---|---|---|---|---|---|
| Illinois | 49,596 | 188.7 | 1,859 | 2,287 | 454 |
| Indiana | 39,804 | 130.8 | 1,349 | 580 | 446 |
| Iowa | 8,987 | 34.0 | 364 | 263 | 72 |
| Michigan | 57,300 | 156.0 | 1,684 | 1,578 | 548 |
| Minnesota | 18,071 | 55.9 | 610 | 777 | 176 |
| Wisconsin | 21,911 | 72.1 | 828 | 537 | 196 |
| **Region total** | **195,669** | **$637.4** | **6,694** | **6,021** | **1,892** |

*1. Areas with a population of 250,000 or more; total population of all metro areas: 35.5 million.*

*2. Based on the number of corn-soybean acres offset by conversion to fruit/vegetable production.*

## Introduction

This is a technical report of the methods used to investigate the possible economic outcomes to expanding local fresh fruit and vegetable agricultural production in the upper Midwest to satisfy a portion of the resident population's expected annual demand. Illinois, Indiana, Iowa, Michigan, Minnesota, and Wisconsin are the states analyzed.

There are two dimensions to this analysis. In the first part of this study, estimates of economic activity associated with fruit and vegetable production are made with the assumption that statewide demands for fresh fruits and vegetables are met solely by that state's producers for a specific period of time. This yields a state-contained local production and consumption summary that will be of interest to single-state marketing and promotion interests as well as state-specific policy development agencies.

The second dimension is more complicated, but somewhat more realistic in that state boundaries are not a delimiting factor in determining potential sales. That evaluation begins at the county level and estimates the potential sales that could be made from any county in the region to any and all metropolitan areas within the region or within 150 miles of the region's boundaries that have populations of 250,000 or more. This evaluation considers the disincentives of distance from markets on the producers' decisions, the proclivity of farmers to actually produce fruits and vegetables, and the amount of available cropland in each county.

Many data sources were utilized for this analysis:

- Detailed state and county-level agricultural production characteristics were derived from U.S. Department of Agriculture's Agricultural Census data for 2007.
- Information on farm- and retail-level fruit and vegetable prices were obtained from the Economic Research Service (ERS) of the USDA.
- Information about fruit and vegetable market retailers at the national level was obtained from the 2007 Economic Census of Retail. Data on state fruit and vegetable markets were obtained from the 2007 County Business Pattern on-line data set at the Census Bureau.
- Data on expected resident population fruit and vegetable consumption were obtained from the USDA and from data imbedded in the Iowa Produce Market Calculator.
- Economic impact modeling data were purchased from Minnesota Implan for each state. Input-output models were constructed to evaluate each participating state's full range of linked economic outcomes associated with the study scenarios.

For reasons that will be evident as the study proceeds, this research does not produce sets of bottom-line determinations of the economic impacts of fresh fruit and vegetable production in the participating states. It produces summaries of the total economic value of such activity, but the real economic impacts to the states in terms of defensible net new economic activity were not estimated in this study. This report was not intended to isolate all of the net new production to the states or the region; hence the economic impacts. Instead, it identifies

the total value of production given the scenarios employed. It will take additional research to discern the state-by-state and regional productivity gains that might accrue after completely accounting for existing regional production of these commodities.

## Upper Midwest Production

Interest has grown nationally in reintroducing fresh fruit and vegetable production to U.S. regions that had long since ceded production to other areas. Table 1 informs us that our national fresh vegetable agricultural sector required 2.82 million acres in 2007, which represents less than .7 percent of all U.S. cropland. A third of those acres are dedicated to sweet corn and potatoes, and just 15 vegetables accounted for 80 percent of the acres dedicated to fresh vegetable production.

**Table 1: Selected Examples of U.S. Vegetables**

| Harvested For Sale (2007) | Acres | Percent of Total | Cumulative Percent of Total | Acres Per 1,000 Persons |
|---|---|---|---|---|
| **Total** | **2,820,130** | **100.0** | | **9.34** |
| Potatoes | 595,804 | 21.1 | 21.1 | 1.97 |
| Sweet Corn | 294,004 | 10.4 | 31.6 | 0.97 |
| Lettuce, Head | 166,967 | 5.9 | 37.5 | 0.55 |
| Watermelons | 151,135 | 5.4 | 42.8 | 0.50 |
| Onions, Dry | 130,925 | 4.6 | 47.5 | 0.43 |
| Tomatoes in the Open | 126,926 | 4.5 | 52.0 | 0.42 |
| Broccoli | 124,362 | 4.4 | 56.4 | 0.41 |
| Beans, Snap | 111,448 | 4.0 | 60.3 | 0.37 |
| Pumpkins | 101,010 | 3.6 | 63.9 | 0.33 |
| Lettuce, Romaine | 87,735 | 3.1 | 67.0 | 0.29 |
| Cantaloupes | 87,430 | 3.1 | 70.1 | 0.29 |
| Sweet Potatoes | 84,004 | 3.0 | 73.1 | 0.28 |
| Cabbage, Head | 76,411 | 2.7 | 75.8 | 0.25 |
| Carrots | 68,058 | 2.4 | 78.2 | 0.23 |
| Cucumbers and Pickles | 61,992 | 2.2 | 80.4 | 0.21 |

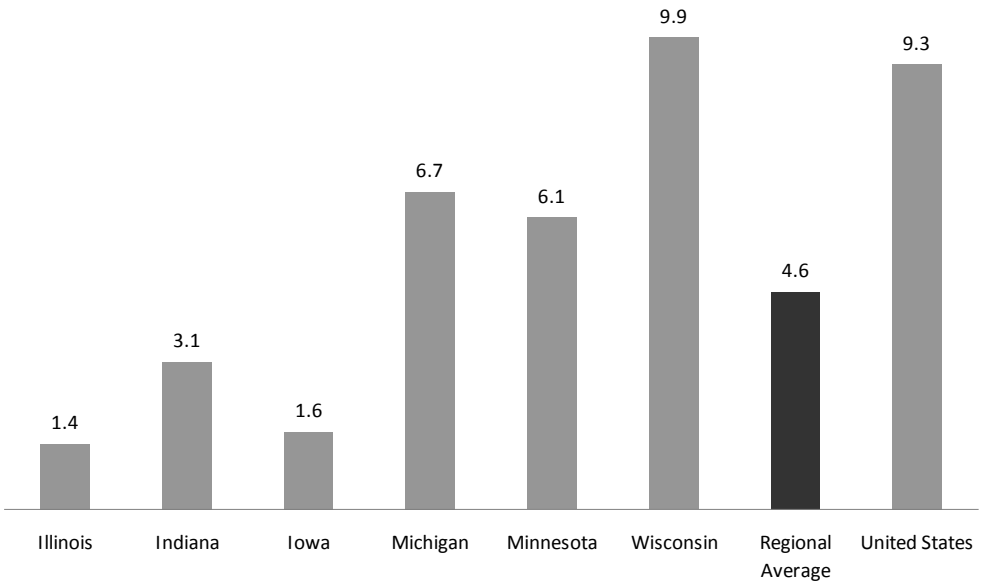
*Source: 2007 Agricultural Census*

Comparatively small parcels of land can be used to meet regional fresh vegetable consumption needs. At the national level, fewer than 100 acres could produce the annual needs of a small city of 10,000 persons. By specific crop, the United States averaged just 4.2 acres per 10,000 persons in fresh tomato crops and 2.5 acres for cabbage. It is evident that relatively small amounts of land can supply the fresh vegetable needs of most Midwestern communities. Larger amounts would be needed to satisfy the demands of larger metropolitan areas or for a state as a whole.

The states evaluated in this study are Illinois, Indiana, Iowa, Michigan, Minnesota, and Wisconsin. These states have widely varying levels of vegetable production as evidenced by Figure 1. Where the previous table indicated a mere 9.3 acres produced the fresh fruit and vegetables for 1,000 persons, the overall regional weighted average was 4.6 acres. The lowest amount was found in Illinois at 1.4 acres in production for 1,000 persons in 2007, followed by Iowa at 1.6 acres. Both Michigan and Minnesota score higher at over 6 acres per 1,000 persons, and Wisconsin exceeds the national average at 9.9 acres.

It may seem that the region produces substantial fractions of regional demand, but closer scrutiny of, for example, the very high Wisconsin score indicates 75 percent of its acres are used to produce potatoes and sweet corn. Michigan and Minnesota also demonstrate strong potato and sweet corn production, so the heavy dominance by just these two vegetables indicates comparatively lower levels of regional production for all other vegetables.

**Figure 1: Fresh Vegetable Acres Per 1,000 Persons, 2007**




### *Comparative Advantages*

We know that there are relatively high levels of vegetable production in some parts of the upper Midwest region or the United States and not in others. At the outset of this study, we must acknowledge an issue that cannot be ignored when evaluating U.S. local foods potential. Owing to variances in the value of soil resources, climate, historical development, population densities, and transportation and other industrial support systems, there are strong regional patterns of crop production. These patterns have evolved over time due to comparative economic advantages in both crop production and distribution. It is a standard tenet of regional economics that whole economies are substantially better off in competitive market systems when producers specialize. Producers will specialize when they are able to supply a commodity at a lower price than their competitors, yet still maintain a profit.

Comparative advantages are influenced by previously discussed factors. Soil and climate must be hospitable to the crop that is produced. Water resources, whether naturally available or engineered, also must be in adequate supply. Within a region, supply and distribution agglomerations will emerge where specialized up-stream and down-stream production inputs (along with transport and handling industries) will evolve and also enhance a region's competitiveness. For many agricultural commodities, regional competitive advantages are so strong they effectively prevent the profitable production of some crops in certain areas.

Figure 2, for example, illustrates the tremendous concentration of U.S. corn production. The darkest areas displayed had 45 percent or more of available cropland in corn in 2007. It also is evident that crop diversity increases and the propensity to plant corn decreases with distance from the high concentration boundaries. Very large tracts of major agricultural states like the Dakotas, Kansas, Oklahoma, and Texas are economically unsuitable to corn production.

**Figure 2**

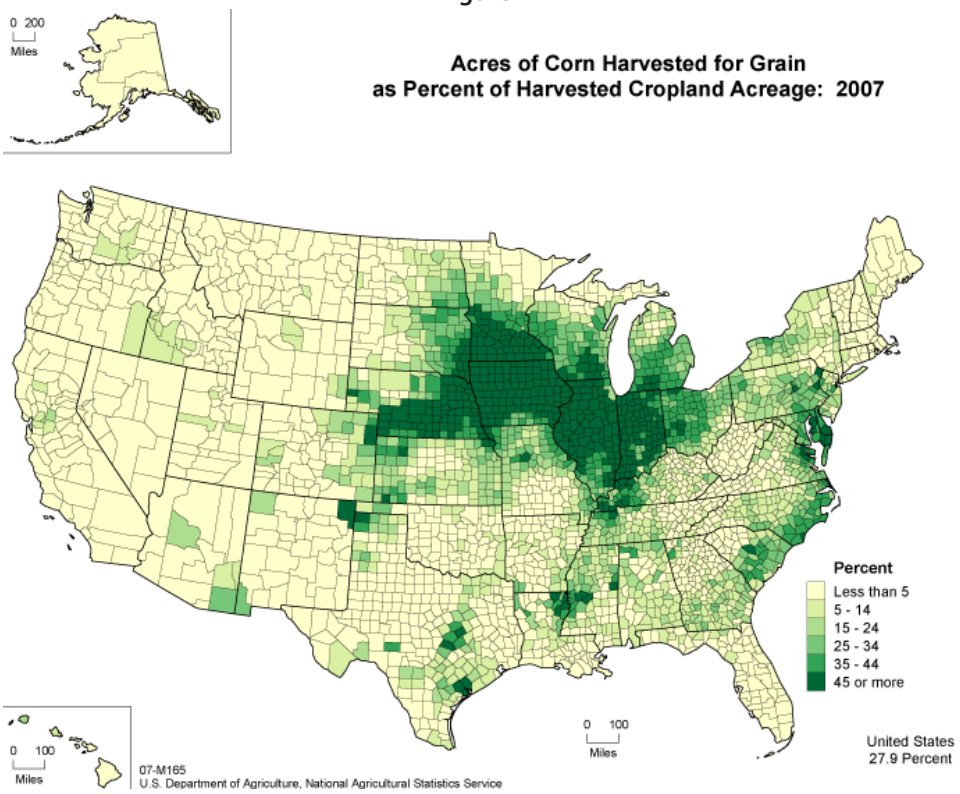
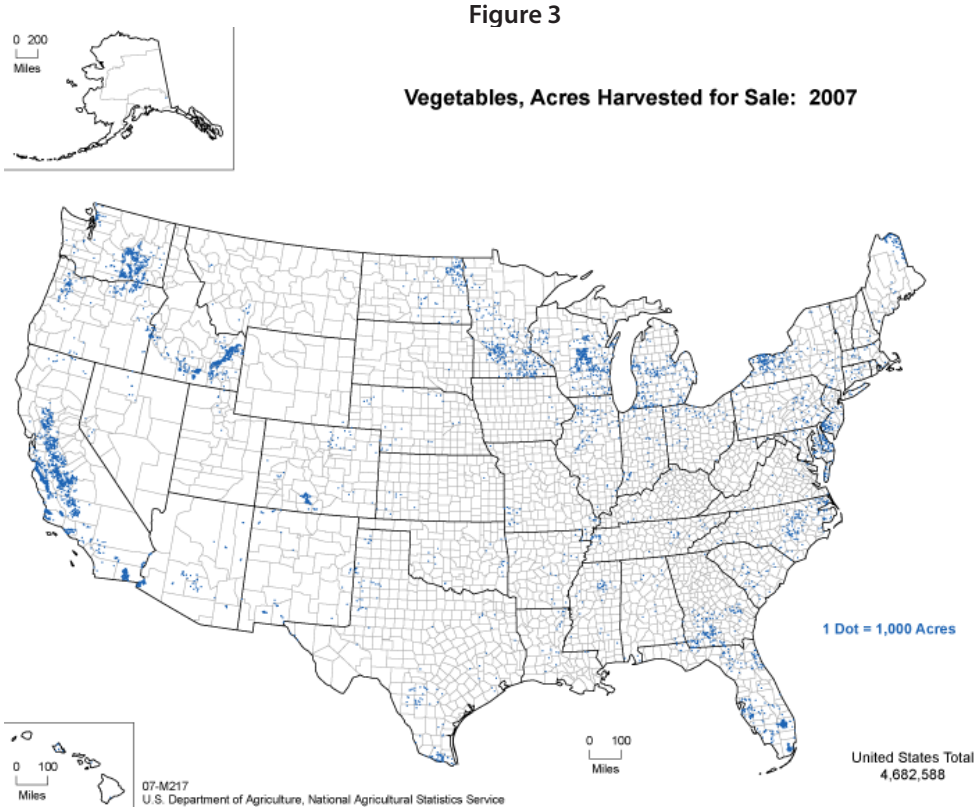


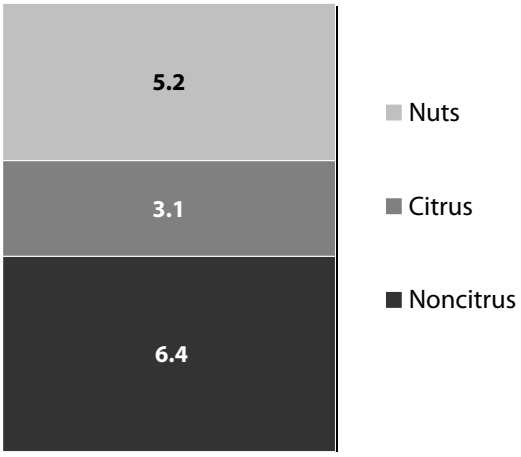

Figure 3 demonstrates how modest and scattered the nation's total harvested vegetable acres concentrations were in 2007. It also shows production prominence, as has already been mentioned, in Minnesota, Michigan, and Wisconsin, and the relative absence of production in Iowa, Illinois, and Indiana – states that otherwise showed very strong advantages in corn production. While there does appear to be a production spatial coincidence between corn and vegetables in the Minnesota example, that type of production alignment is not evident in the cases of Michigan and Wisconsin.

**Figure 3**




U.S. fruit and nut production also is important. Figure 4 gives the total U.S. fruit and nut bearing acres in 2007 per 1,000 persons. Combined acres were 14.9 per person. As citrus acres are highly concentrated in warmer growing regions, the region studied is most suited to producing non-citrus fruits for fresh consumption.

**Figure 4: U.S. Fruit- and Nut-Bearing Acres Per 1,000 Persons, 2007**




There are, however, wide variances in regional production of non-citrus fruits. Figure 5 indicates there were 6.4 fruit bearing acres of this type per 1,000 persons in the United States in 2007, but the regional weighted average was 2.7. Five of the six states have extremely

low values, but Michigan's acres exceed the national average by 50 percent. Michigan has a diversified fruit production system featuring apples, peaches, cherries, and grapes, and is a major fruit producer. Indeed, the region demonstrates a national prominence, not just a strong regional prominence.

Figure 6 gives the same type of estimates for all berry production in the multi-state region. Nationally, just 7/10th of an acre produced the annual berry needs of 1,000 persons. The region, however, exceeds the national average at 1 acre per 1,000 persons. There are extremely low levels of berry production in Illinois, Iowa, Indiana, and Wisconsin. Michigan and Wisconsin are exceptions. Berry acres are three times the national average in Michigan and five times the national average in Wisconsin.

**Figure 5: Noncitrus Fruit-Bearing Acres Per 1,000 Persons, 2007**

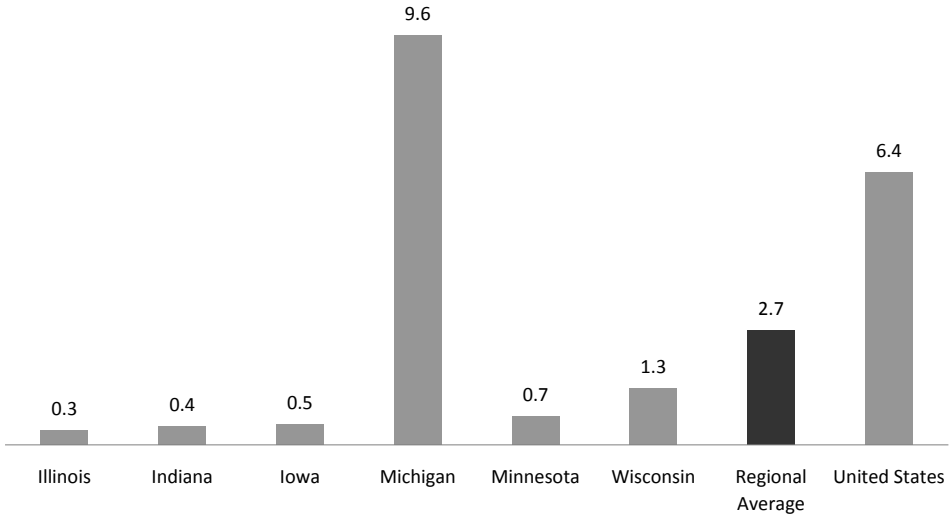



**Figure 6**

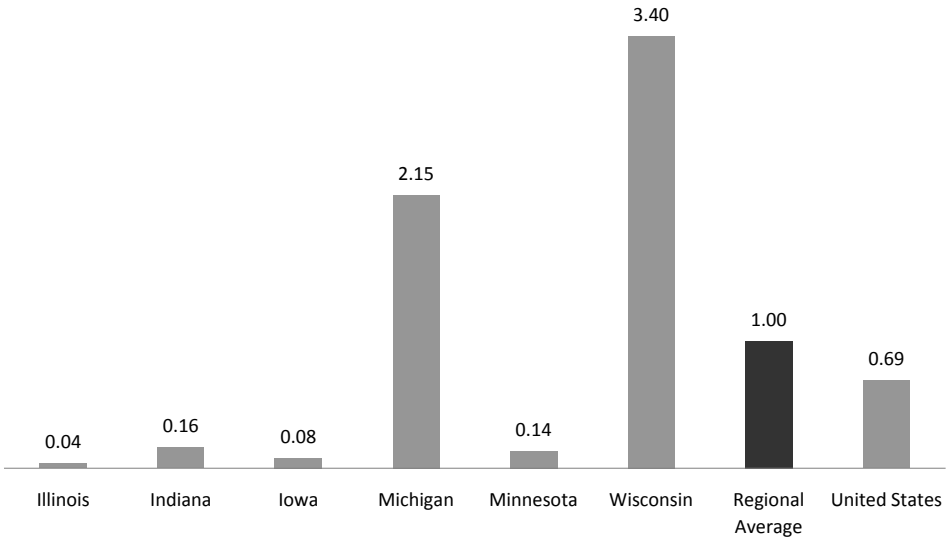


Table 2 summarizes the overall competitiveness of the states regarding fresh vegetable, fruit bearing, and berry bearing acres compared to the national average. These estimates reflect the number of acres (not the productivity of the acres) per capita given each state's average compared to the national average. An expected value of 1.0 means a state is, on an acreage basis for any of the categories, producing at the national average. Values greater than 1.1 indicate a propensity to produce for export, and values less than .9 indicate a need to import these agricultural commodities. Values between .9 and 1.1 are evidence of regional or state level self-sufficiency in production.

While the experiences of the states are mixed across the different categories, Illinois, Indiana, and Iowa rank consistently low or very low on all measures. Minnesota demonstrates minor competitiveness in fresh vegetables, as does Michigan. Michigan demonstrates very strong competitiveness in berry production and a competitive advantage in fruit bearing acres. Wisconsin is considered self-sufficient in fresh vegetable production on an acres basis, but is very prominent in berry production. Overall, the region is considered self-sufficient in berry production, and deficient in fresh vegetable and fruit bearing acres.

**Table 2: Indicators of Regional Production Competitiveness**

| | Fresh Vegetables | Fruit Bearing Acres | Berries |
|---|---|---|---|
| Illinois | 0.15 | 0.05 | 0.06 |
| Indiana | 0.33 | 0.07 | 0.24 |
| Iowa | 0.17 | 0.08 | 0.11 |
| Michigan | 0.71 | 1.50 | 3.11 |
| Minnesota | 0.66 | 0.10 | 0.20 |
| Wisconsin | 1.06 | 0.21 | 4.92 |
| **Regional Average** | **0.49** | **0.42** | **1.45** |
| United States | 1.00 | 1.00 | 1.00 |

The values in this competitiveness index simply look at acres relative to the population. They do not take into account overall productivity or the types of productivity, nor do they factor in growing season length, yield differentials, or other indicators of actual capacity. They do, however, demonstrate that there is an inadequate supply of acres producing fresh vegetables and fruits to support potential local demand if that demand were measured at the national average level. While the region is a very strong producer of potatoes, sweet corn, pumpkins, apples, and cranberries, it remains deficient in many other categories of annual demand for vegetables, fruits, and berries.

Local production and local consumption initiatives argue for plugging gaps in local demand with local production. The data shown thus far demonstrate a reasonably strong potential for production for local consumption among these upper Midwestern states.

## Estimating Local Demand and the Local Production Potential

Our demand for fresh fruits and vegetables is met on a year-round basis from a combination of local, regional, and national suppliers. The amount of supply that possibly can be generated by local producers, however, is constrained primarily by the length of the growing season. The likelihood that demand can be met by local suppliers is a function of both the growing season and the storage qualities of the fruits and vegetables that are produced.

### *Step 1: Per capita consumption*

The potential farm weights and the subsequent retail weights per capita were derived from the Iowa Produce Market Calculator tables, which were based originally on USDA estimates of U. S. production per capita. Table 3 provides the estimated farm-level production required per capita for an abbreviated assortment of fruits and vegetables. These values across the entire range of potential fruits and vegetable crops were applied uniformly to all of the states to provide determinants of the total pounds of each crop that would be required to satisfy either that state's population, which is the first scenario, or in the second scenario, the demands of the residents of all metropolitan areas in the upper Midwest that had populations of 250,000 or more.

**Table 3: Farm and Retail Weight Assumptions, Selected Fruits and Vegetables**

| Item | Farmed Weight (Pounds/Capita) | Retailed Weight (Pounds/Capita) |
|---|---|---|
| Apples | 16.4 | 14.4 |
| Apricots | 0.2 | 0.1 |
| Asparagus | 1.1 | 0.9 |
| Bell Peppers | 6.8 | 5.7 |
| Blueberries | 0.6 | 0.5 |
| Broccoli | 6.0 | 4.9 |
| Cabbage | 8.6 | 6.9 |
| Cantaloupe | 9.9 | 8.0 |
| Carrots | 9.0 | 8.2 |
| Cauliflower | 1.7 | 1.4 |
| Cherries | 1.2 | 1.1 |
| Collard Greens | 0.6 | 0.3 |

### *Step 2: Required Acre Estimates*

Once the total commodity demand is known, the next requirement is to determine the acreage requirements. Again, productivity contained within the Iowa Produce Market Calculator per commodity was used to establish a crop yield baseline. The Iowa Produce Market Calculator contains an array of yield values for fruits and vegetables, and it is used to project the production potential in Iowa counties in light of current fruit and vegetable production. These values have been reviewed by Iowa State University horticulturalists to provide "best estimates" of the state's yield potentials for these crops. Because many of the crops contained

in this research are not grown commercially in Iowa, there are no standardized agricultural statistics on average yields over time or for specific regions of the state. In addition, there is little in-state research on production practices, yield variances, or other production outcomes. The ISU scientists viewed these yields as reasonable for Iowa, given their professional knowledge of overall horticultural production in the state.

Table 4 provides examples of production estimates for Iowa for a selection of fruits and vegetables, and these values were used to identify the number of acres required to produce the whole range of fresh fruits and vegetables that were initially assessed. Before those factors could be used, however, adjustments had to be made for overall average productivity differences across the states.

**Table 4: Selected Crop Yields in Iowa**

| Item | Yield (Pounds Per Acre) |
|---|---|
| Apples | 13,000 |
| Apricots | 9,000 |
| Asparagus | 2,500 |
| Bell Peppers | 8,500 |
| Blueberries | 6,000 |
| Broccoli | 11,000 |
| Cantaloupe | 21,000 |
| Carrots | 30,000 |

Differences in overall grain crop productivity were used to adjust the values in Table 4 to arrive at yield expectations per acre across the six states, as indexed to the Iowa values. Two methods were tested: the first simply summed the total yield of corn, soybeans, and oats per acre for each of the states and compared those values to the Iowa value. The second method was the average of the individual crop indexes compared to the Iowa average. Both methods produced very similar results, but the first method was weighted towards sheer yield volume rather than treating each crop equally, so it was chosen as the method for adjusting the Iowa production values. Table 5 demonstrates the impact of those adjustments. They are applied uniformly across all crops, and when combined with the values in Table 4 and multiplied by the appropriate demand populations, determine the total acres needed to produce for the measured demand. The yield values are estimates of the capacity of the land to produce horticultural output using grain output as the major criterion.

**Table 5**

| | Broccoli | Cantaloupe | Carrots |
|---|---|---|---|
| Illinois | 11,045 | 21,086 | 30,123 |
| Indiana | 9,539 | 18,211 | 26,016 |
| Iowa | 11,000 | 21,000 | 30,000 |
| Michigan | 7,903 | 15,087 | 21,553 |
| Minnesota | 8,978 | 17,140 | 24,485 |
| Wisconsin | 9,557 | 18,245 | 26,064 |

### *Step 3: Determining the Amount of Local Demand that Can be Supplied*

The upper Midwestern growing season is much shorter than the national average, and it is certainly far shorter than those enjoyed by many areas of the United States that have demonstrable competitive advantages in fruit and vegetable production. In previous studies conducted by this researcher, fruit and vegetable production for local demand was constrained to 25 percent of annual demand. That was a reasonable assumption in the early research assuming our general growing season, but it poses too many limits for this research for two important reasons. The first is that there are fruits and vegetables that store well and are therefore available for an extended period after harvest time.

Second, we tend to consume very high quantities of some fruits and vegetables precisely because they are in season, and when they are not in season we are less likely to consume them. Fresh tomatoes, sweet corn and cantaloupes are good examples of seasonally popular produce. Absent any reliable research that demonstrates the actual amounts of annual fruits and vegetables consumed during particular months, the entire array of fresh fruits or vegetables that could be produced for our Midwestern populations were limited to either 25 percent of annual consumption or 50 percent of annual consumption.

Table 6 displays the weights chosen. More perishable produce or items that we consume in relatively constant amounts monthly are scored 25 percent. Those that we consume more often during their peak season or that store well are scored 50 percent. While it may be the case that more than 50 percent of a particular crop can and in fact is produced annually, this analysis set the upper limit at 50 percent.

**Table 6: Local Supply Potential Weights Per Crop by Percent**

| | | | |
|---|---|---|---|
| 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 |

### *Step 4: Determining Realistic Local Production Potential*

In a penultimate step to this overall estimation process, the number of fruits and vegetables measured for local production and local consumption were limited by three factors. The first limiting factor took into account the region's existing overall production of the entire array of fruits and vegetables and excluded those that the region already produced in excess of estimated regional demand. That step excluded items such as potatoes, sweet corn, pumpkin, apples, grapes, cranberries, and cherries.

The second limiting factor was actual evidence of production. For example, no acres of artichokes, celery, or other more tender crops are recorded in the USDA data set for our study region. Third, there were categories for which no prices for 2008, the base year for this analysis, were available from USDA data summaries, so those crops were not analyzed.

Table 7 is the final list of fresh vegetables and fruits for which a realistic increase in local production can occur to satisfy significant portions of realistic local demand and for which prices were either obtained or estimated.

**Table 7: 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 |

There is a final, important point to this overall preliminary estimation process. Subsequent economic analysis does not control for the amount of regional demand that already is met by regional production. The impact summaries that will be produced project the farming or retailing value of these 28 commodities as if the demand values displayed in Table 6 were completely met by regional farmers, irrespective of whether portions of those demands were already met. No net economic production increments are calculated, as there are no region-wide summaries of the actual local production/local consumption relationships. Except for the instances described above where the acres in production far exceed the acres required to satisfy the entire region's needs, no other estimates of existing local production are employed.

## Understanding Economic Impact Analysis

The economic impact, or, in this research, the *economic value*, of a specific type of productivity is ideally measured using an input-output (IO) model of the area of scrutiny. For this study, state- level databases were purchased so that each state's specific economic characteristics were analyzed uniquely, which in turn allowed for state-level summaries.

The tables that are produced in IO models display the amount and the types of economic activities that are generated when fruit and vegetable production increase in a state. There are four categories of economic information that will be produced in subsequent tables:

- Total industrial output. This is the value of production in the industries that we are evaluating.
- Total value added. Value added is composed of wages and salaries to workers, returns to management to sole proprietors, incomes from properties and other investments and indirect tax payments that are part of the industrial production processes. Value added is the same thing as Gross Regional Product (GRP), and it is the standard manner in which we gauge the size of an economic activity, especially on a comparative basis.
- Labor income. Labor income is a subset of value added. It is composed of the payments to workers and the proprietors' incomes. Labor incomes are useful for regional analysis because very large fractions of them accumulate to resident workers, whereas incomes from investments, for example, may accumulate out of the region of scrutiny.
- Jobs. Jobs are not the same as employed persons as many people have more than one job. There are, therefore, more jobs in an economy than employed persons. In addition, jobs are not created equal. Some are seasonal, others are part-time. The modeling system provides an annualized value of the jobs associated with some level of industrial output even if the jobs only occur during a short period of time, which would be the case for fruit and vegetable production jobs or many other crop production jobs.

There are three levels of economic activity that are summarized.

- Direct activity. This refers to all of the listed economic values for the industry that we are assessing. In subsequent analyses, for example, all fresh fruit and vegetable production is the direct activity.
- Indirect activity. All firms require inputs into production such as raw commodities, chemicals, services, wholesale goods, transportation, banking services, and utilities. When levels increase or decrease in the direct sector, that influences the demand for inputs.
- Induced activity. This occurs when workers in the direct firm and workers in the indirect (supplying) sectors convert their labor incomes to household consumption. This stimulates another round of regional economic activity that, in turn, stimulates jobs and pays incomes.

We can sum these values to arrive at an estimate of the total economic value of a particular kind of industrial production.

The phrase economic value is used instead of economic impact. In this kind of analysis, we reserve the term economic impact for occasions in which we can document net increases in regional productivity. Those increases would happen if a region were expanding export sales or, as is the case here, reducing imports by substituting locally grown foods for imported foods. The degree to which an economic activity is indeed producing incremental export or import substituting gains constitutes the regional economic impact. This study, however, identifies the full value of the economic activity (fruit and vegetable farming), but does not estimate how much of that production would be considered new production in the state or regional economies. That distinction is even harder to discern when one assumes that there are substantial imports into, say, Illinois or Indiana from Michigan. Were Illinois to effectively substitute for imports, for example, it would favor local production over Michigan imports. Accounting at this level of complexity is not possible in this study.

## Input–Output Model Modifications and Other Considerations

Data were purchased to build IO models for each of the participating states. Assuming the region, on net, has deficits in its overall production of vegetables and fruits, those two separate sectors were modified in all of the regions so that they more closely approximated national averages (The local production scenario logically presupposes the attainment of production efficiencies and labor to output ratios that would be competitive with national producers. ) This modification meant restating the employment in each state so that it made payments to workers and producers similar to national averages, with payments to labor adjusted for the state's average per job relative to the national average. This allows the modeling system to suppose efficient and to-scale fruit and vegetable production on a statewide basis. It also eliminates the distortions that occur because one type of production predominates in states such as Iowa and Minnesota where production might be highly concentrated in just a few crops.

Land amounts are treated as fixed in the subsequent analyses. Accordingly, if there is an increase in production of fruits and vegetables in the upper Midwest, that land must come from existing crop production. As corn and soybean are the dominant crops in these states, comparisons are made to an equivalent amount of corn and soybean farming on the same acres to demonstrate the potential net shifts in regional jobs, incomes, etc., in moving from one form of crop production to another. The comparative amount of land needed to satisfy regional fruit and vegetable demand is relatively small, so the overall production consequences to the total corn and soybean industry are nominal, but still must be acknowledged.

## Scenario 1: Statewide Economic Values

The previous iterative estimation processes were designed to identify the total acres of production that would be required to satisfy a schedule of fresh fruits and vegetables for state residents for a portion of the consuming year. The primary driver of this is population-based consumption, which determines the total value at both the farm and retail level of that demand.

There are two values to be determined to gauge the value of production for local consumption. First are the amounts that would accrue to farmers. In Table 8 that amount ranges from

$263.95 million in Illinois to $61.43 million in much smaller Iowa. Summed for the region, using 2008 average U.S. prices, the 28 fresh vegetables and fruits included in this analysis would boost regional farm gross sales by $882.44 million.[1]

Another value is the number of acres that are required. Remembering that those acres include expected productivity adjustments, 270,025 acres are needed to produce the region's fruits and vegetables. Again, that value ranged from a low of 16,215 acres in Iowa to 75,192 in Michigan. To provide perspective, the average Iowa county (of which there are 99), has slightly less than 266,000 acres of harvested cropland. The cropland required to produce solely for Iowa's needs is a mere 6.1 percent of the cropland of one Iowa county. The cropland required to produce enough for the entire region amounted to slightly more than the average sized Iowa county.

**Table 8**

| | 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** |

Table 8 also lists the retail values of these fruits and vegetables. Retail sales could be as high as $988.7 million in Illinois and as much as $230.1 million in Iowa. In total, the potential retail value of these 28 crops in 2008 prices was $3.31 billion.

### *A Note on the Total Economic Value Summaries*

There will be two economic value summaries presented. The first will focus, most importantly, on the farm-level consequences of increased fruit and vegetable production. The second will include a partial evaluation of the statewide value of 50 percent of the crops that are grown and then sold through a network of fruit and vegetable markets.

In previous research in Iowa, the evaluation supposed the operation of a network of farmer-retail systems that marketed 50 percent of local food production directly to state consumers. Those estimates were intended to hypothesize the potential job values that would accrue to the state if the goal of local production were achieved, the development of such marketing systems successful, and the farmer producers were able to realize profits both at the farm and retail levels. This assumed the complete absorption by farmer-retailers of all farm-to-market intermediate costs such as transportation, warehousing, processing and storage. No explicit modeling was conducted to evaluate an intermediate transportation sector or a sector that sorted, organized, stored or otherwise readied the produce for retail, and those margins were subsumed within the hypothesized retail sector.

1 While each state produces fruits and vegetables for local consumption to varying degrees, there is no state-level enterprise research demonstrating the average costs of production for the entire range of crops that are described in the two subsequent scenarios.

According to County Business Patterns, there were 329 combined fruit and vegetable establishments in this region that had employees on payroll. Were the region's fruit and vegetable markets to emulate the average national characteristics of these types of operations, considering average sales per operation nationally, and assuming farmers sold half of their production directly to retail customers and the remainder to existing wholesalers, 1,405 establishments would be required. It is obvious that the capacity does not exist to distribute fruits and vegetables widely on a retail basis if those averages were in fact applied to the region.

The subsequent assessment of the retail value will suppose that all of those 1,405 establishments are in operation, it will staff the operations and pay that staff, it will provide estimates of proprietors' and investors' incomes as well. In short, the direct values of such an operation will be estimated as if they in fact could exist. In addition, estimates are made of the induced values that would be attributed to those fruit and vegetable retail workers and their owners (the farmers) when converting their labor incomes into household consumption.

There will be no estimates made of intermediate (indirect) consequences of operating those markets, however. The gaps in credible research across these states are too large to allow us to include these markets' transportation, storage, and other processing requirements and the extent to which the margins associated with those activities would be subsumed in the overall operating configuration of the fruit and vegetable marketing system or evaluated separately. As transportation, processing, and storage are important components of the equation, it would be irresponsible to fabricate values.[2]

Last, a very large fraction of the transportation, processing, and distribution industries already exists in some form or another in all of these states where they offer efficient distribution of all fruit, vegetable, and other perishable commodities via the states' existing retail grocery establishments. It does not follow that there will be substantial new productivity added to those sectors by developing farmer-retail operations. Additional value-chain research needs to be conducted to evaluate the jobs and facilities needed to distribute and sell locally grown fruits and vegetables and to determine whether there is, in fact, new productivity in the state economies that can be credited to these scenarios.

### *Farm-Level Economic Values*

Table 9 gives the state-by-state farm-level economic values associated with producing the 28 fruits and vegetables according to the seasonal, consumption, and storage assumptions contained in Table 6 and the annual consumption assumptions contained in Table 3. A detailed explanation of the Illinois values will assist the reader in translating the information and interpreting the situation in the remaining states.

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2 For example, an acre of Iowa land producing 180 bushels of corn will yield just under 11,000 pounds of crop that must be hauled somewhere. Considering all the 28 fruit and vegetable weights that could be produced per acre in Iowa, and given the mixes assumed for local consumption, slightly less than 13,000 pounds of crop could be produced on the same hypothetical acre. The boost in freight hauled would be 18 percent by weight. There is, therefore, more economic activity measured on a weight-per-acre basis, but the value of that activity given the total crops produced and the total average length of trips must be estimated by realistic logistics research before conclusions can be drawn.

The direct output values are derived from Table 8. Producing $263.95 million in fruit and vegetable output (the annual sales value of the crop in this study) in Illinois required 1,555 jobs on the farm and paid $69.163 million in labor income to those workers, to include payments to the farm proprietor. In all, that level of productivity would support $127.6 million in value added. Those farms indirectly stimulated $86.7 million in output in the supplying sectors, which required 430 jobs receiving $26.35 million in labor incomes. When the workers in the indirect and direct sectors converted their labor incomes into household consumption, they induced $84.997 million in output in the state, which in turn required 616 jobs making $27.02 million in labor income. The total economic values are the sums of the direct, indirect, and induced values. For Illinois, that farm-level production of fruits and vegetables would have supported $435.64 million in total output, $221.34 million in total value added, $120.53 million in labor incomes, and 2,600 jobs.

For the entire region, this level of production would support the equivalent of 9,302 jobs, making $395.12 million labor incomes, and otherwise generating $719.8 million in total value added (or GDP).

Looking at all of the states, the total economic value numbers range from a high of 2,600 jobs in Illinois to a low of 657 jobs in Iowa. The expected labor income *per job* ranges from $46,320 in Illinois to $39,640 in Wisconsin, with an overall regional total of about $42,500.

The last column for the state values contains total multipliers. The multiplier is the total value divided by the direct value. The multiplier of 1.65 for output means that for every $1 of output at the farm level (sales), there is $.65 in additional output supported in the remainder of the economy. The multipliers of 1.74 for both value added and labor income mean that for each $1 of either category generated at the farm level, $.74 in value added or labor income is stimulated in the rest of the Illinois economy. The job multiplier of 1.67 means that for every job at the farm level, 67/100th of a job is supported in the rest of the economy.

Multipliers are useful for helping us project the net expected gains to the state's economy once analysts are able to determine exactly how much of the productivity measured in each state (Table 9) represents a true increment to state-level production to satisfy local demand. As has already been mentioned, that total value is unknown. Given the values in Table 2, we would conclude that a high fraction of the values in Iowa, Illinois, Indiana, and Minnesota represent net new statewide productivity. The amounts in Wisconsin and Michigan are expected to be less given their competitive scores. Still, substantial fractions would be expected to represent net new state productivity as this analysis excluded crops that the region already was producing in surplus of estimated regional demand and were therefore exporting beyond the region. Note that no multipliers are provided for the region as a whole, as a region-total model was never generated in this study. A region-total multiplier could be seen as legitimate if the region were considered a cohesive economy. Given the variations in urbanization, production, industrial specialization, and overall state competitiveness, it is a stretch to consider the region a cohesive economy.

**Table 9: Farm-Level Economic Values of Fruit and Vegetable Production for Statewide Sales**

| State of Illinois Farm-Level Economic Values of Fruit and Vegetable Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 263,950,323 | 86,688,680 | 84,997,216 | 435,636,227 | 1.65 |
| Value Added | 127,558,152 | 44,716,188 | 49,064,504 | 221,338,848 | 1.74 |
| Labor Income | 69,162,656 | 24,348,676 | 27,015,164 | 120,526,488 | 1.74 |
| Jobs | 1,554.7 | 429.7 | 615.8 | 2,600.2 | 1.67 |

| State of Indiana Farm-Level Economic Values of Fruit and Vegetable Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 130,461,427 | 44,888,300 | 36,179,636 | 211,529,355 | 1.62 |
| Value Added | 63,089,360 | 21,135,514 | 20,059,036 | 104,283,912 | 1.65 |
| Labor Income | 34,211,988 | 11,461,290 | 10,544,666 | 56,217,944 | 1.64 |
| Jobs | 768.7 | 269.7 | 307.1 | 1,345.5 | 1.75 |

| State of Iowa Farm-Level Economic Values of Fruit and Vegetable Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 61,428,634 | 19,720,308 | 15,908,231 | 97,057,174 | 1.58 |
| Value Added | 29,659,442 | 9,701,801 | 8,848,662 | 48,209,904 | 1.63 |
| Labor Income | 16,078,570 | 5,499,578 | 4,746,462 | 26,324,608 | 1.64 |
| Jobs | 357.3 | 148.8 | 151.2 | 657.3 | 1.84 |

| State of Michigan Farm-Level Economic Values of Fruit and Vegetable Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 204,657,877 | 57,582,548 | 59,813,640 | 322,054,069 | 1.57 |
| Value Added | 99,046,496 | 31,530,772 | 34,229,924 | 164,807,184 | 1.66 |
| Labor Income | 53,719,520 | 18,371,182 | 18,462,414 | 90,553,120 | 1.69 |
| Jobs | 1,207.20 | 512.9 | 489.9 | 2,210.0 | 1.83 |

| State of Minnesota Farm-Level Economic Values of Fruit and Vegetable Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 106,802,903 | 31,773,506 | 33,837,884 | 172,414,295 | 1.61 |
| Value Added | 51,627,900 | 17,612,270 | 19,316,914 | 88,557,088 | 1.72 |
| Labor Income | 27,994,426 | 10,490,675 | 10,603,391 | 49,088,492 | 1.75 |
| Jobs | 628.7 | 264.5 | 273.5 | 1,166.7 | 1.86 |

**Table 9 *(continued)***

| State of Wisconsin Farm-Level Economic Values of Fruit and Vegetable Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 115,141,383 | 34,581,184 | 33,593,668 | 183,316,231 | 1.59 |
| Value Added | 55,724,480 | 18,051,900 | 18,882,664 | 92,659,040 | 1.66 |
| Labor Income | 30,223,102 | 11,796,601 | 10,389,269 | 52,408,972 | 1.73 |
| Jobs | 679.2 | 343.1 | 299.8 | 1,322.1 | 1.95 |

| Combined States Farm-Level Economic Values of Fruit and Vegetable Production | | | | |
|---|---|---|---|---|
| | Direct | Indirect | Induced | Total |
| Output | | | | |
| Value Added | | | | |
| Labor Income | | $ 81,968,002 | | |
| Jobs | 5,196 | 1,969 | 2,137 | 9,302 |

Table 10 represents the land-based conventional farming offsets that would occur were increased fruit and vegetable production in the upper Midwest to result in decreased corn and soybean farming. This assumption is important because the amount of good crop land in the United States is relatively fixed, after controlling for urbanization, and the cost of conversion must be acknowledged. This exercise also is useful in that it offers an easy to understand description of the job and income trade-offs that would occur if were there a shift in land use across the states.

The value of corn and soybean land-use offsets was determined by dividing the values of industrial output for grain and oilseed farming by the total number of acres required to produce the fruit and vegetable output in the previous table, considering the actual mix of production in the states between the two crops. In so doing, final adjustments were made to the per acre estimates as corn and soybeans are not the only field crops produced in those two major sectors. Next, combined reductions in both types of crop production were entered into the model for each state to gauge the combined value of corn and soybean production for the states in 2008.

Each state has different labor to output relationships for grain and oilseed crops. Iowa, Illinois, and Minnesota, for example, require fewer jobs to produce $1 million of soybeans or corn when compared to Wisconsin and Michigan. This leads to variances in the job offsets that would accrue during a production transition from conventional crops to fruits and vegetables.

For the entire region, the land required to produce the total fruit and vegetable sales in Table 9 would have produced the equivalent of $305.6 million in direct output in the corn and soybean sectors, which in turn required 1,763 jobs (including farm operators) making $24.23 million in labor income, and supporting $137.2 million in value added, according to the findings in Table 10. Those operations supported $91.1 million in output in the supplying sectors, which required 494 jobs making $22.48 million in labor incomes. The conversion of labor incomes and property incomes into household spending induced $40.5 million in additional output, requiring 320 more jobs making $12.4 million in labor incomes. Across the region, those acres of production supported 2,578 jobs making $59.12 million in labor incomes and

supporting $207.2 million in regional value added.

**Table 10: Farm-Level Economic Values of Corn and Soybean Production on the Land Required to Produce Fruits and Vegetables**

| State of Illinois Farm-Level Economic Values of Corn and Soybean Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 86,145,969 | 27,680,814 | 12,095,627 | 125,922,409 | 1.46 |
| Value Added | 39,009,748 | 14,403,362 | 6,985,017 | 60,398,128 | 1.55 |
| Labor Income | 6,612,731 | 6,714,199 | 3,842,689 | 17,169,618 | 2.60 |
| Jobs | 429.1 | 117.5 | 87.9 | 634.5 | 1.48 |
| **State of Indiana Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 47,576,027 | 14,631,397 | 5,129,580 | 67,337,007 | 1.42 |
| Value Added | 21,985,462 | 6,921,434 | 2,845,634 | 31,752,530 | 1.44 |
| Labor Income | 3,249,144 | 3,148,492 | 1,494,071 | 7,891,706 | 2.43 |
| Jobs | 322.9 | 78.5 | 43.6 | 445.1 | 1.38 |
| **State of Iowa Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 19,785,741 | 5,611,198 | 2,532,031 | 27,928,969 | 1.41 |
| Value Added | 8,471,430 | 2,787,113 | 1,409,677 | 12,668,220 | 1.50 |
| Labor Income | 1,949,522 | 1,381,789 | 754,050 | 4,085,361 | 2.10 |
| Jobs | 69.9 | 36.5 | 24.1 | 130.5 | 1.87 |
| **State of Michigan Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 78,711,216 | 23,450,011 | 10,434,288 | 112,595,513 | 1.43 |
| Value Added | 35,336,707 | 12,086,410 | 5,928,991 | 53,352,109 | 1.51 |
| Labor Income | 6,428,203 | 5,797,899 | 3,226,703 | 15,452,803 | 2.40 |
| Jobs | 502.5 | 132.0 | 84.4 | 718.9 | 1.43 |
| **State of Minnesota Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 39,149,625 | 10,739,312 | 5,392,018 | 55,280,953 | 1.41 |
| Value Added | 17,660,402 | 5,985,748 | 3,079,060 | 26,725,210 | 1.51 |
| Labor Income | 3,191,955 | 2,912,177 | 1,688,171 | 7,792,302 | 2.44 |
| Jobs | 220.1 | 72.4 | 43.7 | 336.2 | 1.53 |

**Table 10 *(continued)***

| State of Wisconsin Farm-Level Economic Values of Corn and Soybean Production | | | | | |
|---|---|---|---|---|---|
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 34,256,078 | 8,940,384 | 4,931,338 | 48,127,798 | 1.40 |
| Value Added | 14,743,749 | 4,745,775 | 2,773,064 | 22,262,588 | 1.51 |
| Labor Income | 2,797,632 | 2,523,316 | 1,404,300 | 6,725,248 | 2.40 |
| Jobs | 218.7 | 57.4 | 36.7 | 312.9 | 1.43 |

| Combined State Farm-Level Economic Values of Corn and Soybean Production | | | | |
|---|---|---|---|---|
| | Direct | Indirect | Induced | Total |
| Output | $ 305,624,656 | $ 91,053,116 | | |
| Value Added | $ 137,207,498 | $ 46,929,842 | | $ 207,158,785 |
| Labor Income | $ 24,229,186 | $ 22,477,872 | | $ 59,117,038 |
| Jobs | 1,763 | 494 | 320 | 2,578 |

Table 11-A compares the job and labor income values in Table 9 and Table 10 given the two uses of the land. The highest job ratio is in Iowa at 5.04, meaning that for each job producing soybeans and corn on the same amount of land, fruit and vegetable production would support more than five jobs in the total economy after all economic interrelationships are estimated. The net job trade-off per converted acre is 5.04 fruit and vegetable jobs, minus 1.0 conventional farming job, or 4.04 jobs. The lowest ratios are in Indiana at 3.02 and Michigan at 3.07. Those states had more jobs associated with corn and soybean production than the regional average, in large part due to comparatively smaller farm sizes. The regional weighted average was 3.61.

Table 11-B also contains the total labor income ratios. The highest was found in Wisconsin at 7.79 and the lowest in Michigan at 5.86. The regional average was $6.68.

**Table 11-A**

**Total Job Ratios Comparing Fruit and Vegetable Production With Corn and Soybean Production on the Same Number of Acres**

| | A<br>Total Fruits and Vegetable Jobs | B<br>Total Corn and Soybean Jobs | A:B<br>Ratio of A to B |
|---|---|---|---|
| Illinois | 2,600.2 | 634.5 | 4.10 |
| Indiana | 1,345.5 | 445.1 | 3.02 |
| Iowa | 657.3 | 130.5 | 5.04 |
| Michigan | 2,210.0 | 718.9 | 3.07 |
| Minnesota | 1,166.7 | 336.2 | 3.47 |
| Wisconsin | 1,322.1 | 312.9 | 4.23 |
| **Combined Region** | **9,301.8** | **2,578.1** | **3.61** |

**Table 11-B**

**Total Income Ratios Comparing Fruit and Vegetable Production With Corn and Soybean Production on the Same Number of Acres**

| | A<br>Total Fruits and Vegetable Labor Incomes | B<br>Total Corn and Soybean Labor Incomes | A:B<br>Ratio of A to B |
|---|---|---|---|
| Illinois | 120,526,488.0 | 17,169,618.0 | 7.02 |
| Indiana | 56,217,944.0 | 7,891,706.0 | 7.12 |
| Iowa | 26,324,608.0 | 4,085,361.0 | 6.44 |
| Michigan | 90,553,120.0 | 15,452,803.2 | 5.86 |
| Minnesota | 49,088,492.0 | 7,792,302.0 | 6.30 |
| Wisconsin | 52,408,972.0 | 6,725,247.8 | 7.79 |
| **Combined Region** | **$ 395,119,624.0** | **$ 59,117,038.0** | **6.68** |

### *Retail-Level Consequences*

Table 8 indicated that the total retail value of all of these fruits and vegetables would be in excess of $3.3 billion at 2008 retail prices. It has been suggested that it is a reasonable goal for farmers to seek greater returns on their effort by developing networks of farmer-owned fruit and vegetable retail establishments.

There are many impediments to developing such a system of farmer-retailers. Farming by its very nature is scattered, and already demands substantial management effort during growing seasons. Crop production and distribution periods often overlap as crop seasons can be early, middle, or late. An efficient subdivision of producer energy into both farm and retail management expertise, logistics, warehousing, processing, distribution, and direct sales has yet to be demonstrated by the research or actual, regional-scale enterprises.

Nonetheless, it is possible to envision a cooperative fruit and vegetable sales system. If a system did develop to directly market locally grown commodities, then it is possible to identify the labor needs, the rates of pay, the expected profit margins to owner-operators as well as to all other cooperative shareholders using national fruit and vegetable retail market characteristics from the U.S. 2007 Retail Census of Business.

Were the region's newly producing fruit and vegetable farmers to market 50 percent of their crop as direct sales, and if the fruit and vegetable retail markets were to emulate national sales averages, then Table 12 gives the total number of establishments and jobs that would be required. In all, at the establishment level, 1,405 operations and 9,652 jobs would be needed to market the locally grown produce. A mere 98 establishments and 672 jobs are required for Iowa, compared to 420 establishments and 2,887 jobs to distribute these locally grown fruits and vegetables in Illinois.

**Table 12: 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** |

It already has been mentioned that estimating the increments to regional productivity as a result of this fabricated system is problematical. First, fresh fruits and vegetables already are distributed efficiently and profitably in all of the states via existing grocers as well as through existing direct fruit and vegetable sales operations; consequently, large fractions of total in-state warehousing and transfer activities already exist. Similarly, shifts in sales to these markets come directly at the expense of existing retailers and distributors, and society and the economy are not sensitive to the party who makes the final retail sale. It is assumed that a dollar of labor income made in a traditional grocery store regardless of ownership structure is equivalent to a dollar in labor income generated in a fruit and vegetable market even if it is producer-owned.

The subsequent analysis will provide only an estimate of the direct job and labor income values of all labor at the fruit and vegetable markets displayed in Table 12, as well as the regional value of those workers converting their incomes into household spending in the respective states. No indirect economic values will be estimated.

Table 13 contains the retail job summaries. The jobs numbers are based on national averages for labor requirements per $1 million in total sales. State-level payroll values per job were gleaned from County Business Pattern estimates for the respective states for actual fruit and vegetable markets and were subsequently applied to this scenario. A return to proprietorship was included that represented the same proprietor-to-employee income ratio as was found in miscellaneous retail establishments at the regional level. That same method was used to estimate total value added. The top portion of Table 13 contains those estimates. In selling half of the locally produced crops, the fruit and vegetable markets would require 9,652 jobs making a total of $287.7 million in labor income and producing $415.7 million in value added. When those 9,652 job holders converted their labor incomes into household consumption, they inductively generated 2,458 jobs in the six-state region making $95.553 million in labor incomes, which in turn supported $172.4 million in value added.

**Table 13**

**Farmer-to-Retail Direct Sales Economic Values**

| | Labor Income | Value Added | Jobs |
|---|---|---|---|
| Illinois | 91,128,497 | 130,922,811 | 2,887 |
| Indiana | 46,094,353 | 66,080,230 | 1,427 |
| Iowa | 17,145,685 | 25,183,869 | 672 |
| Michigan | 63,943,264 | 92,776,858 | 2,238 |
| Minnesota | 35,213,800 | 50,816,181 | 1,168 |
| Wisconsin | 34,210,846 | 49,901,698 | 1,259 |
| **Combined Region** | **$ 287,736,445** | **$ 415,681,646** | **9,652** |

**Farmer-to-Retail Induced Economic Values From Employee Spending**

| | Labor Income | Value Added | Jobs |
|---|---|---|---|
| Illinois | 33,620,710 | 59,956,706 | 756 |
| Indiana | 13,494,182 | 25,109,348 | 388 |
| Iowa | 4,838,934 | 8,806,720 | 153 |
| Michigan | 20,867,976 | 37,890,992 | 548 |
| Minnesota | 12,020,463 | 21,561,442 | 306 |
| Wisconsin | 10,711,519 | 19,028,933 | 306 |
| **Combined Region** | **$ 95,553,784** | **$ 172,354,141** | **2,458** |

## Scenario 2: Marketing to Regional Metropolitan Markets

While the first scenario circumscribed production with each study state, markets are quite unmindful of political boundaries. A farmer in Michigan likely will be selling to strong market demand in Illinois and Indiana, as well as other Midwestern states.

This scenario begins with a completely different demand premise. It first assumes that the large and concentrated metropolitan population demands create opportunities for production efficiencies and intra-regional advantages that might otherwise not be evident when simply producing for in-state demand of varying population densities. Large population centers send a powerful and consistent signal to producers interested in developing their locally grown enterprises. That signal is strongest and most consistent for growers nearer the metropolitan areas than for those at a distance.

It also assumes that the draw of nearby metropolitan areas must be part of any calculation of regional production potential. Accordingly, adjacent and relatively close metropolitan areas are included in the subsequent measures. Last, a particular county can be expected to produce primarily for one or even multiple metropolitan areas, provided transportation distances are reasonable. Other counties at much greater distances are assumed to not produce for any metropolitan market. This means that some counties, given the assumptions that are used, will not be candidates for enhanced fruit and vegetable production in this scenario.

### *Step 1: Choosing Candidate Metropolitan Areas*

This region, according to the factors determined and measured in the previous section, can produce enough of the 28 measured fresh fruits and vegetables for 160 persons from each acre of land, given our existing consumption preferences. A city of 10,000 would, on average, need just 62.5 acres of local production to satisfy its needs as measured in this report.

When considering a significant boost to regional fruit and vegetable production, the most consistent regional demand will be generated from larger metropolitan areas. Those larger areas would require a concentrated level of regional production levels that could stimulate beneficial economies of scale internal to the producers as well as economies external to the producers, such as shared marketing, warehousing, transportation, coordination, and other production-benefitting activities downstream from the producer.

In this assessment, metropolitan markets will have a population of 250,000 or more. There always have been and always will be elements of local fruit and vegetable production for all metropolitan areas. But if the emphasis is on encouraging the most production to serve the most concentrated demand, focusing on the region's largest metropolitan areas offers the greatest production volume relative to the average distance a producer might be from any given major market. Smaller metropolitan markets are important, but this analysis considered the major metropolitan areas as the primary drivers of local foods production potential.

The metropolitan areas are measured in terms of all the counties that comprise the metropolitan or the combined metropolitan areas. Table 14 lists the 28 primary upper Midwest metropolitan markets. They range from a low of 252,472 persons in metropolitan Cedar Rapids, Iowa, to a high of 9.5 million in the Chicago region. The average size is 1.27 million persons, although the average is skewed sharply by the larger places – just seven are larger than the weighted average, and 21 are smaller.

**Table 14: Metro Areas with Populations ≥250,000**

| 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** |

In addition, the table includes several metropolitan markets that are on the edges or outside of the six states. The Omaha, St. Louis, Toledo, Cincinnati, Dayton, Evansville, and Louisville metropolitan areas contain substantial populations that are not part of our six-state totals, but are well within marketing reach of many of the states' producers.

### *Step 2: Determining the Propensity and the Capacity to Produce*

Research recently completed at Iowa State University provided a procedural template for the next step in the estimation process. A 12-county area (primarily rural and sparsely populated) wanted to gauge the farmer income potential of expanding production for an area including the metropolitan markets of Omaha on the western edge and Des Moines on the eastern edge.

There were three factors that mathematically determined the propensity to produce for those markets:

- ***Factor 1.*** The number of farms sized smaller than 50 acres. Small farms in the upper Midwest are more likely to produce fruits and vegetables than standard farms. The incidence of small farms also is greater in more urban counties.

- ***Factor 2.*** The amount of harvested cropland in 2007. This is simply the supply of land that can be farmed for any purpose.

- ***Factor 3.*** Distance. The probability of either Factor 1 or Factor 2 contributing to any of the several metropolitan areas' local food demands is constrained by the miles that produce must be transported. In the subsequent analysis, a threshold distance of 150 miles was established. Distance to a market need not be limited, but for the purposes of identifying primary potential production areas, the 150-mile limit seemed reasonable.[3]

We consider that Factor 1 is the propensity to produce, Factor 2 is the sheer ability to produce, and Factor 3 is a countervailing limit on production for a particular market due to distance or the impacts of transportation costs on farmer returns.

### *Step 3: Calculating Distances*

A matrix of distances was calculated for each of the 535 counties to each of the 28 metropolitan markets within 150 miles. This 535 X 28 matrix of values represented the right-angled distance between all points considering the population weighted midpoint of the county, and the population weighted midpoint of the entire metropolitan area that was to be served. Each metropolitan area's population-weighted midpoint represented the point on a plane that considered the densely populated central cities and the less dense suburban county place compositions. Each county's midpoint in the six-state region was the weighted value of all places within the county.

This process provided all of the potential to-metropolitan supply opportunities, as well as the distances that were used to adjust the production propensity and production capacity factors.

### *Step 4: Calculating Weights*

All counties assessed under Factor 1 and Factor 2 generated a score representing the propensity or capacity of the county to produce for the metropolitan regions, given their sums of distances from all of them. By dividing those factors by the sum of all scores for all counties, we get the share of that factor's contribution to the total value for each metropolitan candidate, again as weighted by either the propensity to produce (the small farms factor) or the capacity to produce (the cropland factor).

### *Step 5: Calculating Regional and Extra-Regional Demand*

It was assumed that all of the metropolitan areas completely contained within the six-state region could have 100 percent of their fresh fruits and vegetable consumption produced by

3 Recent research in a 12-county region of southwestern Iowa considered the probability of selling to metropolitan markets on their eastern and western borders. Using the methods employed here, that research demonstrated that the probability of producing for a metropolitan area was relatively low given a 100-mile distance from that metro area. To be somewhat conservative, a 150-mile threshold was chosen to allow as much possible and realistic production inclusion as seemed practical given the emphasis on "local food" production, rather than national markets. The ISU report can be found at: *http://www.leopold.iastate.edu/research/marketing_files/swiowa.pdf*.

regional farmers, given the production assumption limits in Table 6 (either 25 percent or 50 percent of the demand, depending on the type of fruit or vegetable). For all metropolitan areas that bordered these six states, just 50 percent of their population demand was used. The justification is that the other side of that metropolitan region, the portion in states outside of the region, was just as capable of producing for that metropolitan area as the counties within the region. The same assumption was used for the metropolitan areas in Ohio that were somewhat distant from the regional boundaries, but still were potential markets. The 50 percent limit was applied to them, but the extra distance also limited the overall propensity to produce for that region. As those three Ohio metropolitan midpoints were a scant one-county's distance from the regional boundaries, no other adjustments were made for them. No adjustments were made for either Detroit or Fort Wayne, as their weighted population midpoints were well within the state boundaries.

### *Step 6: Applying the Weights to Metropolitan Demands*

The Step 4 allocation values in each county for Factor 1 and for Factor 2 were applied to the estimated demand for each metropolitan area, to the extent the county was within the 150-mile limit. This produced two values for each county. The first was the sum of all metropolitan demands weighted by the number of small farms, as limited by distance. The second would be the sum of all metropolitan demands weighted by the amount of harvested cropland, as limited by distance. Those two factors were averaged to estimate the average amount of demand for each metropolitan area that would be met by each county in the region. That value was then divided by the statewide productivity values per county in those states to estimate the number of acres that would be producing for the metropolitan areas.

Table 15 provides the aggregate outcomes. Within the six states, 195,669 acres would be required to produce $637.4 million in fruit and vegetable sales. Those farm-level sales would have a retail sales value of $2.39 billion, given 2008 prices.

**Table 15: Production Outcomes for the Metropolitan Markets**

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

The visual outcomes are more dramatic and reflect the much higher concentrations of production that would be expected for counties that were close to metropolitan areas or were serving more than one major market. Figure 7 shows the estimated allocation of acres for the entire region. The population midpoints of the 28 metropolitan areas also are displayed on the map as well. It is immediately evident that, given the 150-mile production threshold, it is not feasible for 54 counties to produce for any of our large metropolitan areas. These areas are, logically, most of the western two or three tiers of counties in Minnesota extending into northwest Iowa, plus much of northern Wisconsin, the Upper Peninsula of Michigan along with other northern Michigan counties, plus a few counties in extreme southern Illinois. The lightest values represent 5 to 249 acres, with the implicit understanding that the value approaches 249 acres closer to a metro and 5 acres farther away. The amount of acre potential per county is greater than 1,000 in the two darkest-colored categories.

**Figure 7: Expected Acres**

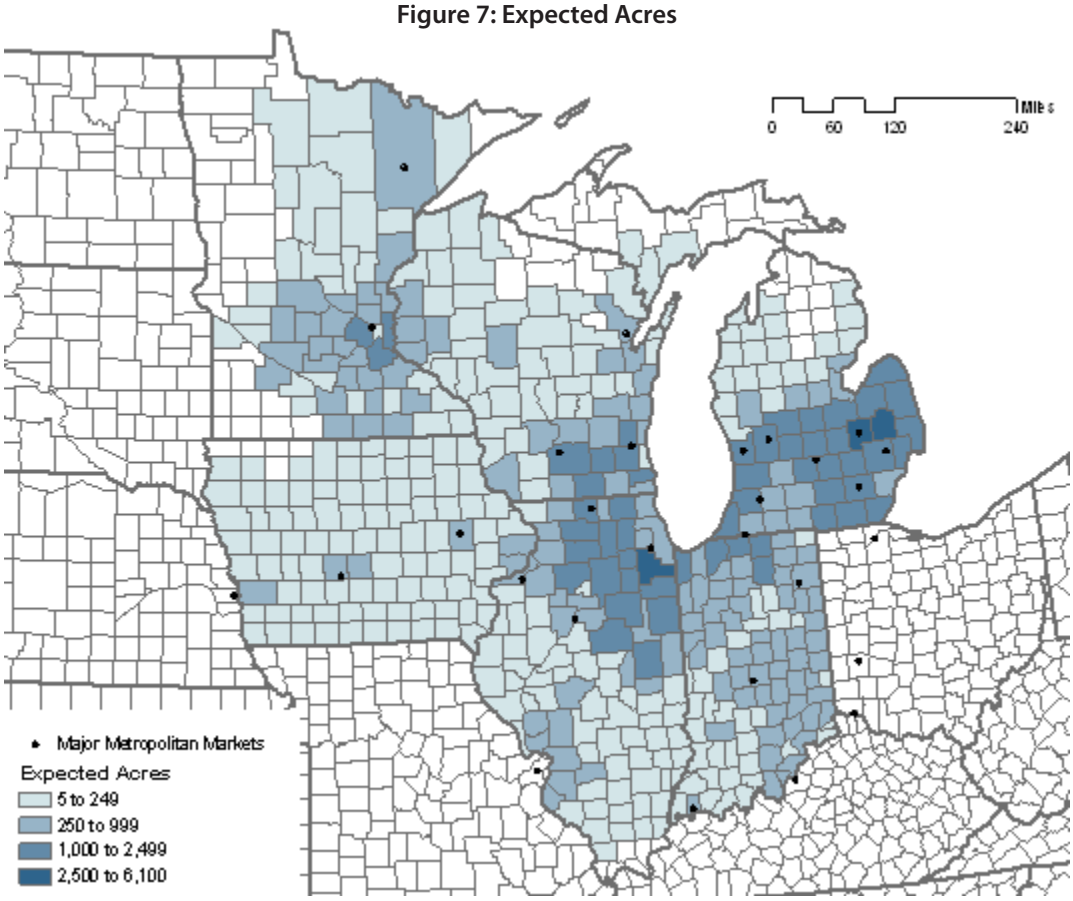
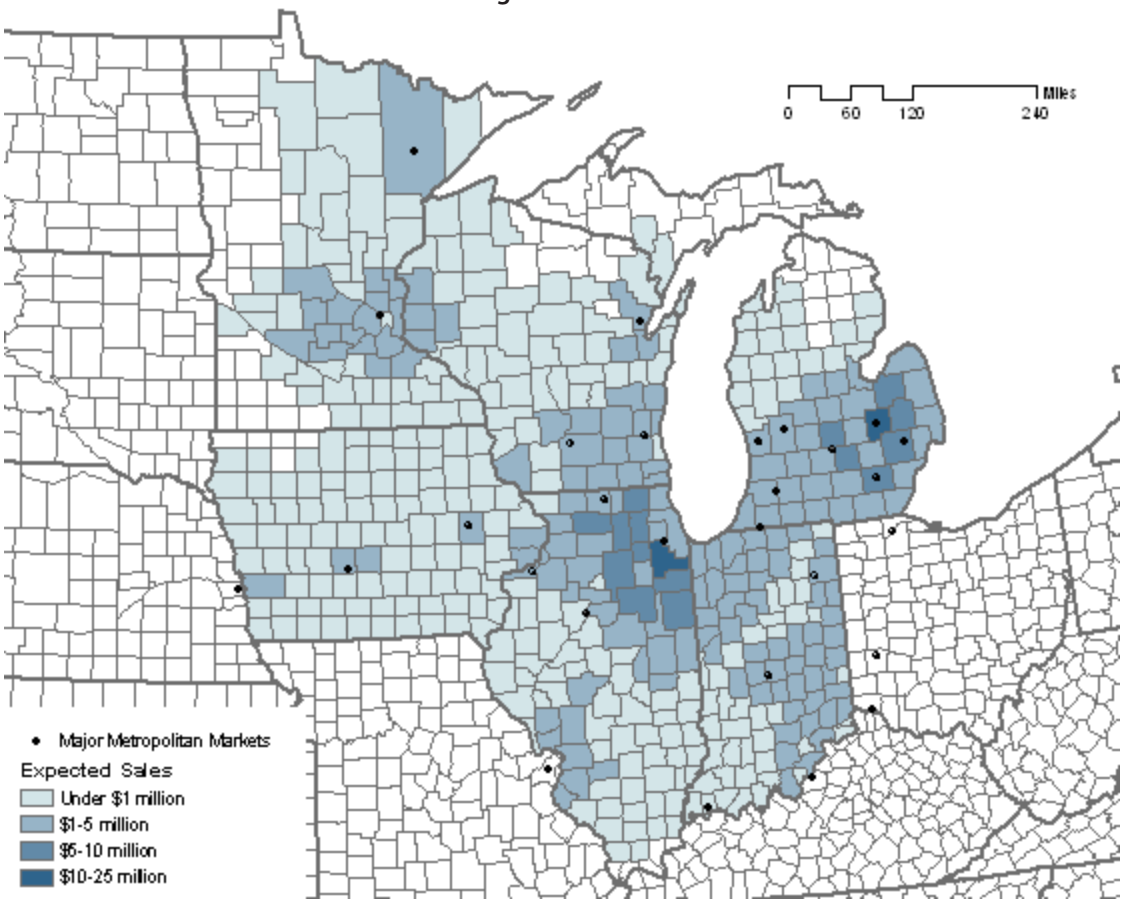



Figure 8 provides the same type of information translated into estimated farm sales value gradients. The lightest county values are less than $1 million, with those at the greatest distance from the metropolitan areas approaching values that are less than $15,000 per county. The two darker categories indicate total fruit and vegetable farm sales potentials in excess of $5 million.

**Figure 8: Farm Sales**




## Economic Outcomes

Table 16 gives the distributions that result from the acreage and sales allocation processes just described. There would be fewer than 250 acres of production in 53 percent of the counties and just 10.5 percent had the potential of 1,000 acres or more. Over 57 percent of the counties would see gross farm-level sales under $1 million, and only 3.2 percent would see sales in excess of $5 million. The higher productivity intervals of 250 to 999 acres and $1 million to $4,999,999 in sales appear to be the categories where most of the intermediate-level production and sales would occur.

**Table 16: 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** | **$1 M 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 |

Table 17 summarizes the acreage values, farm sales, and the estimated sales per acre for our metropolitan production scenario. As before, strong advantages accumulate to Illinois in total sales. More acres of Michigan's cropland would be required than for any other state due to the productivity adjustment that was described in Table 5. More distant and less populous Iowa has the lowest farm sales and acre values.

**Table 17: 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** |

Table 18 uses the state-by-state multiplier values that were produced in Table 9 to give estimated total economic values associated with the sales listed in the previous table. For the region, the total economic output would be $1.027 billion, with 6,694 jobs requiring $284.61 million in labor income producing $519.4 million in value added (or GDP) based on the value of the fruit and vegetable sales and concomitant indirect and induced activity that would be supported.

**Table 18: 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** |

Table 19 provides the total economic values that would be produced in the region if those same acres were used to produce conventional row crops in the six states. It also serves as an estimate of the offsets that would accrue in the state economies when land is converted from one productive use to another. Within the scenario of producing for the major metropolitan markets, the land required for fruit and vegetable production would generate—under corn and soybean production—$317.9 million in industrial output, $150.6 million in value added, and $42.5 million in labor income, and would support 1,892 jobs considering all farm-level activity, indirect inputs, and induced activity.

**Table 19: 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** |

An estimate of state-by-state retail sales values to align with the amounts presented in Table 13 is problematic for two reasons. First, the estimation process allows for cross-state sales. While the sales values, as well as all farm-level impacts, can be allocated to the originating county, values are accumulating elsewhere when the crops are sold in out-of-state regions. Second, retail impacts would be expected to accumulate where the direct jobs (farmer-to-consumer retail jobs) are located. A farmer-producer job would be counted in one state, and a farmer-retailer, and all other retail jobs, might be counted in another state. Plus, this modeling process considered sales to major metropolitan areas that are outside of the region, which are not estimated.

Table 20 allocated 50 percent of the farm output as retail sales to the appropriate metropolitan area and summarized by state within the region or out-of-state metropolitan area. The direct sales activity is assigned to the state in which the population-weighted metropolitan midpoint is located. This major metropolitan apportionment puts $391.6 million in retail sales into Illinois, just $44.98 million into Iowa, and $162.84 million to cities that are outside the region. In all, the retail value is $1.194 billion.

**Table 20**

| 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** |

Table 21 also allocates the direct sales activity to the state in which the population-weighted metropolitan midpoint is located. It uses the same implied multipliers for each state that were revealed in Table 13, times the amount of sales that would accrue in each region displayed in the previous table. No estimates of job, labor income, or value added impacts are made for the out-of-region sales. It lists the market-specific (or direct) economic values plus the consequences of those workers consuming their incomes in the regional economy (the induced values).

In all, the major metropolitan option requires 6,021 jobs at the markets making $180.7 million in labor incomes and generating $260.88 million in value added. When those labor incomes are converted into household spending, they support 1,537 more jobs in the area economies making $61.3 million in labor incomes, and supporting $110.3 million in total value added.

Again, it must be emphasized that the labor activity as well as the sum of the induced consequences represents a shift in production out of grocery stores into the fruit and vegetable markets. The extent to which this production yields higher worker and farmer-retailer personal incomes has yet to be validated by commercial developments of this type and concomitant research of that transformation process.

**Table 21**

**Farmer-Retail Sales Direct Economic Values: Metropolitan Sales Locations**

| Location of Retail Sales | Labor Income | Value Added | Jobs |
|---|---|---|---|
| Illinois | 72,184,841 | 103,706,773 | 2,287 |
| Indiana | 18,744,727 | 26,872,183 | 580 |
| Iowa | 6,703,165 | 9,845,721 | 263 |
| Michigan | 45,069,723 | 65,392,772 | 1,578 |
| Minnesota | 23,417,536 | 33,793,279 | 777 |
| Wisconsin | 14,582,034 | 21,270,104 | 537 |
| Out of Region | Unk | Unk | Unk |
| **Regional Total** | **$ 180,702,027** | **$ 260,880,832** | **6,021** |

**Farmer-Retail Induced Economic Values from Employee Spending: Metropolitan Sales Locations**

| Location of Retail Sales | Labor Income | Value Added | Jobs |
|---|---|---|---|
| Illinois | 26,631,687 | 47,492,996 | 599 |
| Indiana | 5,487,543 | 10,210,966 | 158 |
| Iowa | 1,891,798 | 3.443, 018 | 60 |
| Michigan | 14,708,569 | 26,707,058 | 386 |
| Minnesota | 7,993,730 | 14,338,579 | 204 |
| Wisconsin | 4,565,679 | 8,110,894 | 131 |
| Out of Region | Unk | Unk | Unk |
| **Regional Total** | **$ 61,279,007** | **$ 110,303,512** | **1,537** |

## Conclusions and Cautions

The results of this report are modeled projections based on sets of successive assumptions. The longer the string of assumptions, the more tenuous is one's confidence in the outcomes. Consequently, owing to the linear and linked nature of the modeling process, early assumptions

carry great weight by the time final results are determined. Average fruit and vegetable yields among our states were indexed to variations in grain yields per acre as a proxy for production. This is the foundation for the variation across the states and the initial productivity driver for our states. In addition, those variations are applied to estimates of Iowa fruit and vegetable production potentials for many crops that are not produced in large amounts commercially. Those estimates have been reviewed by ISU horticulturalists, but they remain estimates.

If state stakeholders believe or subsequently determine that the crop adjustments are too low or too high for a particular state, the amount of required acres can be changed. **The farm level fruit and vegetable production total economic impact values for any state, however, do not change as the value of production in any of our states is determined by population demand.** Any adjustment in acres would affect the corn and soybean production offsets, as those calculations are acre-determined. So, for example, if the Michigan productivity index of 72 percent were changed to 85 percent, that would mean that less land was needed to produce fruits and vegetables. Accordingly, all of the corn and soybean values in both Scenarios 1 and 2 would be multiplied by 72/85th to reflect the reduced required acreage.

The research used 2008 farm-level and retail prices. Data from 2008 also were used in the modeling system that was employed. That was an atypical year in that there was a run-up in food and farm input prices in 2008. Nonetheless, the alignment of the expected crop prices with the modeling structure assures that the job requirements and concomitant labor incomes also are in temporal alignment.

As was mentioned, much more additional research needs to be conducted concerning the industrial relationships between production and retail activity to determine if, in fact, more jobs are required in the economies to handle, transport, and distribute those goods than would otherwise exist to move the same volume of goods irrespective of the farm-to-retail configurations assumed in this report. As such, economic value conclusions for the fruit and vegetable markets were incomplete.

Under Scenario 2, crop acres were used to estimate the capacity to produce for metropolitan markets. To be consistent with the rest of the report, those acres could have been adjusted for their productivity levels prior to closing that component of the modeling system. As a consequence, areas with expected lower productivity are scored slightly higher and areas with higher productivity are scored slightly lower. As the primary determinant of production values in that portion of the modeling section was distance from the metropolitan markets, those errors in the estimation process are not necessarily significant in the aggregate.

Readers are reminded that Scenarios 1 and 2 are to be interpreted separately. **Results must not be added together.** From the standpoint of this researcher, Scenario 2 is a much more realistic depiction of a potential producer-to-consumer relationship in space and in overall farm values. Dense metropolitan demand will hypothetically induce production proximate to that demand. Suppliers at greater distances will incur higher costs and will be less inclined towards this type of production. Those dynamics are captured with the methods used in that particular evaluation. In addition, it is probably unrealistic to expect significant fresh fruit and vegetable production in many sparsely populated areas located at a distance from metropolitan demand. These dynamics are captured in Scenario 2.

This has been a modeling process to produce sets of reasonable results given the chosen assumptions and the limits to the data. The job and income projections presuppose the ability to produce at much higher levels than is currently done, save for the state of Michigan which has extensive fruit and vegetable production experience. It also assumes a much larger network of farmer-retailers that are expected to emulate national sales patterns for establishments of that type. In addition, that assumption presupposes sufficient merchant and managerial capacity to provide those services.

Given these expectations, one must not forget that in our studied states the very high levels of fresh fruit and vegetable consumption needs *are not met* by regional producers nor are they handled by direct-distribution from farmer retailers. There are sound and powerful market antecedents for those facts that, despite this research, cannot be assumed away.

# Appendix 1: State Summaries

## *Summary Findings: Illinois*

**Scenario 1: Production for In-State Consumption**

| Fresh Fruit and Vegetable Production Outcomes | | | | | |
|---|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value | | |
| Illinois | 69,387 | 263,950,324 | 988,696,097 | | |
| **State of Illinois Farm-Level Economic Values of Fruit and Vegetable Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 263,950,323 | 86,688,680 | 84,997,216 | 435,636,227 | 1.65 |
| Value Added | 127,558,152 | 44,716,188 | 49,064,504 | 221,338,848 | 1.74 |
| Labor Income | 69,162,656 | 24,348,676 | 27,015,164 | 120,526,488 | 1.74 |
| Jobs | 1,555 | 430 | 616 | 2,600 | 1.67 |
| **State of Illinois Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 86,145,969 | 27,680,814 | 12,095,627 | 125,922,409 | 1.46 |
| Value Added | 39,009,748 | 14,403,362 | 6,985,017 | 60,398,128 | 1.55 |
| Labor Income | 6,612,731 | 6,714,199 | 3,842,689 | 17,169,618 | 2.60 |
| Jobs | 429 | 118 | 88 | 635 | 1.48 |
| **Farmer-Retail Sales Direct Economic Values** | | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs | |
| Illinois | 494,348,049 | 91,128,497 | 130,922,811 | 2,887 | |
| **Farmer-Retail Sales Induced Economic Values** | | | | | |
| | | Labor Income | Value Added | Jobs | |
| Illinois | | 33,620,710 | 59,956,706 | 756 | |

**Scenario 2: Production for Major Metropolitan Areas**

| Fresh Fruit and Vegetable Production Outcomes | | | | |
|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value* | |
| Illinois | 49,596 | 188,664,354 | 391,583,716 | |
| **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 |
| **Farm-Level Total Economic Values of Corn and Soybean Production Considering Sales to Selected Metropolitan Areas** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Illinois | 90,005,838 | 43,170,903 | 12,272,366 | 454 |
| **Farmer-Retail Sales Direct Economic Values** | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs |
| Illinois | 391,583,716 | 72,184,841 | 103,706,773 | 2,287 |
| **Farmer-Retail Sales Induced Economic Values** | | | | |
| | | Labor Income | Value Added | Jobs |
| Illinois | | 26,631,687 | 47,492,996 | 599 |

* *The state in which the sales occurred, not necessarily the state where farm production occurred*

## *Summary Findings: Indiana*

**Scenario 1: Production for In-State Consumption**

| Fresh Fruit and Vegetable Production Outcomes | | | | | |
|---|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value | | |
| Indiana | 39,709 | 130,461,426 | 488,677,950 | | |
| **State of Indiana Farm-Level Economic Values of Fruit and Vegetable Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 263,950,323 | 86,688,680 | 84,997,216 | 435,636,227 | 1.65 |
| Value Added | 127,558,152 | 44,716,188 | 49,064,504 | 221,338,848 | 1.74 |
| Labor Income | 69,162,656 | 24,348,676 | 27,015,164 | 120,526,488 | 1.74 |
| Jobs | 1,555 | 430 | 616 | 2,600 | 1.67 |
| **State of Indiana Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 47,576,027 | 14,631,397 | 5,129,580 | 67,337,007 | 1.42 |
| Value Added | 21,985,462 | 6,921,434 | 2,845,634 | 31,752,530 | 1.44 |
| Labor Income | 3,249,144 | 3,148,492 | 1,494,071 | 7,891,706 | 2.43 |
| Jobs | 323 | 79 | 44 | 445 | 1.38 |
| **Farmer-Retail Sales Direct Economic Values** | | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs | |
| Indiana | 244,338,975 | 46,094,353 | 66,080,230 | 1,427 | |
| **Farmer-Retail Sales Induced Economic Values** | | | | | |
| | | Labor Income | Value Added | Jobs | |
| Indiana | | 13,494,182 | 25,109,348 | 388 | |

**Scenario 2: Production for Major Metropolitan Areas**

| Fresh Fruit and Vegetable Production Outcomes | | | | |
|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value* | |
| Indiana | 39,804 | 130,774,296 | 99,362,877 | |
| **Farm-Level Total Economic Values for Selected Metropolitan Fruit and Vegetable Sales** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Indiana | 212,036,639 | 104,534,003 | 56,352,764 | 1,349 |
| **Farm-Level Total Economic Values of Corn and Soybean Production Considering Sales to Selected Metropolitan Areas** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Indiana | 67,498,493 | 31,828,678 | 7,910,632 | 446 |
| **Farmer-Retail Sales Direct Economic Values** | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs |
| Indiana | 99,362,877 | 18,744,727 | 26,872,183 | 580 |
| **Farmer-Retail Sales Induced Economic Values** | | | | |
| | | Labor Income | Value Added | Jobs |
| Indiana | | 5,487,543 | 10,210,966 | 158 |

* *The state in which the sales occurred, not necessarily the state where farm production occurred*

## *Summary Findings: Iowa*

**Scenario 1: Production for In-State Consumption**

| Fresh Fruit and Vegetable Production Outcomes | | | | | |
|---|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value | | |
| Iowa | 16,215 | 61,428,632 | 230,097,269 | | |
| **State of Iowa Farm-Level Economic Values of Fruit and Vegetable Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 61,428,634 | 19,720,308 | 15,908,231 | 97,057,174 | 1.58 |
| Value Added | 29,659,442 | 9,701,801 | 8,848,662 | 48,209,904 | 1.63 |
| Labor Income | 16,078,570 | 5,499,578 | 4,746,462 | 26,324,608 | 1.64 |
| Jobs | 357 | 149 | 151 | 657 | 1.84 |
| **State of Iowa Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 19,785,741 | 5,611,198 | 2,532,031 | 27,928,969 | 1.4 |
| Value Added | 8,471,430 | 2,787,113 | 1,409,677 | 12,668,220 | 1.5 |
| Labor Income | 1,949,522 | 1,381,789 | 754,050 | 4,085,361 | 2.1 |
| Jobs | 70 | 37 | 24 | 131 | 1.9 |
| **Farmer-Retail Sales Direct Economic Values** | | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs | |
| Iowa | 115,048,634 | 17,145,685 | 25,183,869 | 672 | |
| **Farmer-Retail Sales Induced Economic Values** | | | | | |
| | | Labor Income | Value Added | Jobs | |
| Iowa | | 33,620,710 | 59,956,706 | 756 | |

**Scenario 2: Production for Major Metropolitan Areas**

| Fresh Fruit and Vegetable Production Outcomes | | | | |
|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value* | |
| Iowa | 16,215 | 61,428,632 | 230,097,269 | |
| **Farm-Level Total Economic Values for Selected Metropolitan Fruit and Vegetable Sales** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Iowa | 53,976,912 | 26,721,816 | 14,591,221 | 364 |
| **Farm-Level Total Economic Values of Corn and Soybean Production Considering Sales to Selected Metropolitan Areas** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Iowa | 15,480,487 | 7,021,749 | 2,264,437 | 72 |
| **Farmer-Retail Sales Direct Economic Values** | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs |
| Iowa | 44,978,664 | 6,703,165 | 9,845,721 | 263 |
| **Farmer-Retail Sales Induced Economic Values** | | | | |
| | | Labor Income | Value Added | Jobs |
| Iowa | | 1,891,798 | 3,443,018 | 60 |

* *The state in which the sales occurred, not necessarily the state where farm production occurred*

## *Summary Findings: Michigan*

**Scenario 1: Production for In-State Consumption**

| Fresh Fruit and Vegetable Production Outcomes | | | | | |
|---|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value | | |
| Michigan | 75,192 | 204,657,875 | 766,600,472 | | |
| **State of Michigan Farm-Level Economic Values of Fruit and Vegetable Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 204,657,877 | 57,582,548 | 59,813,640 | 322,054,069 | 1.57 |
| Value Added | 99,046,496 | 31,530,772 | 34,229,924 | 164,807,184 | 1.66 |
| Labor Income | 53,719,520 | 18,371,182 | 18,462,414 | 90,553,120 | 1.69 |
| Jobs | 1,207 | 513 | 490 | 2,210 | 1.83 |
| **State of Michigan Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 78,711,216 | 23,450,011 | 10,434,288 | 112,595,513 | 1.43 |
| Value Added | 35,336,707 | 12,086,410 | 5,928,991 | 53,352,109 | 1.51 |
| Labor Income | 6,428,203 | 5,797,899 | 3,226,703 | 15,452,803 | 2.40 |
| Jobs | 502 | 132 | 84 | 719 | 1.43 |
| **Farmer-Retail Sales Direct Economic Values** | | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs | |
| Michigan | 383,300,236 | 63,943,264 | 92,776,858 | 2,238 | |
| **Farmer-Retail Sales Induced Economic Values** | | | | | |
| | | Labor Income | Value Added | Jobs | |
| Michigan | | 20,867,976 | 37,890,992 | 548 | |

**Scenario 2: Production for Major Metropolitan Areas**

| Fresh Fruit and Vegetable Production Outcomes | | | | |
|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value* | |
| Michigan | 57,300 | 155,960,538 | 270,165,054 | |
| **Farm-Level Total Economic Values for Selected Metropolitan Fruit and Vegetable Sales** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Michigan | 245,422,881 | 125,592,122 | 69,006,449 | 1,684 |
| **Farm-Level Total Economic Values of Corn and Soybean Production Considering Sales to Selected Metropolitan Areas** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Michigan | 85,803,963 | 40,657,236 | 11,775,884 | 548 |
| **Farmer-Retail Sales Direct Economic Values** | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs |
| Michigan | 270,165,054 | 45,069,723 | 65,392,772 | 1,578 |
| **Farmer-Retail Sales Induced Economic Values** | | | | |
| | | Labor Income | Value Added | Jobs |
| Michigan | | 14,708,569 | 26,707,058 | 386 |

* *The state in which the sales occurred, not necessarily the state where farm production occurred*

## *Summary Findings: Minnesota*

**Scenario 1: Production for In-State Consumption**

| Fresh Fruit and Vegetable Production Outcomes | | | | | |
|---|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value | | |
| Minnesota | 34,541 | 106,802,906 | 400,058,674 | | |
| **State of Minnesota Farm-Level Economic Values of Fruit and Vegetable Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 106,802,903 | 31,772,506 | 33,837,884 | 172,414,295 | 1.61 |
| Value Added | 51,627,900 | 17,612,270 | 19,316,914 | 88,557,088 | 1.72 |
| Labor Income | 27,994,426 | 10,490,675 | 10,603,391 | 49,088,492 | 1.75 |
| Jobs | 629 | 265 | 273 | 1,167 | 1.86 |
| **State of Minnesota Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 39,149,625 | 10,739,312 | 5,392,018 | 55,280,953 | 1.41 |
| Value Added | 17,660,402 | 5,985,748 | 3,079,060 | 26,725,210 | 1.51 |
| Labor Income | 3,191,955 | 2,912,177 | 1,688,171 | 7,792,302 | 2.44 |
| Jobs | 220 | 72 | 44 | 336 | 1.53 |
| **Farmer-Retail Sales Direct Economic Values** | | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs | |
| Minnesota | 200,029,337 | 35,213,800 | 50,816,181 | 1,168 | |
| **Farmer-Retail Sales Induced Economic Values** | | | | | |
| | | Labor Income | Value Added | Jobs | |
| Minnesota | | 12,020,463 | 21,561,442 | 306 | |

**Scenario 2: Production for Major Metropolitan Areas**

| Fresh Fruit and Vegetable Production Outcomes | | | | |
|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value* | |
| Minnesota | 18,071 | 55,875,658 | 133,021,549 | |
| **Farm-Level Total Economic Values for Selected Metropolitan Fruit and Vegetable Sales** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Minnesota | 90,201,314 | 46,330,066 | 25,681,435 | 610 |
| **Farm-Level Total Economic Values of Corn and Soybean Production Considering Sales to Selected Metropolitan Areas** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Minnesota | 28,921,120 | 13,981,724 | 4,076,668 | 176 |
| **Farmer-Retail Sales Direct Economic Values** | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs |
| Minnesota | 133,921,120 | 23,417,536 | 33,793,279 | 777 |
| **Farmer-Retail Sales Induced Economic Values** | | | | |
| | | Labor Income | Value Added | Jobs |
| Minnesota | | 7,993,730 | 14,338,579 | 204 |

* *The state in which the sales occurred, not necessarily the state where farm production occurred*

## *Summary Findings: Wisconsin*

**Scenario 1: Production for In-State Consumption**

| Fresh Fruit and Vegetable Production Outcomes | | | | | |
|---|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value | | |
| Wisconsin | 34,982 | 115,141,376 | 431,292,628 | | |
| **State of Wisconsin Farm-Level Economic Values of Fruit and Vegetable Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 115,141,383 | 34,581,184 | 33,593,668 | 183,316,231 | 1.59 |
| Value Added | 55,724,480 | 18,051,900 | 18,882,664 | 92,659,040 | 1.66 |
| Labor Income | 30,223,102 | 11,796,601 | 10,389,269 | 52,408,972 | 1.73 |
| Jobs | 679 | 343 | 300 | 1,322 | 1.95 |
| **State of Wisconsin Farm-Level Economic Values of Corn and Soybean Production** | | | | | |
| | Direct | Indirect | Induced | Total | Multiplier |
| Output | 34,256,078 | 8,940,384 | 4,931,338 | 48,127,798 | 1.40 |
| Value Added | 14,743,749 | 4,745,775 | 2,773,064 | 22,262,588 | 1.51 |
| Labor Income | 2,797,632 | 2,523,316 | 1,404,300 | 6,725,248 | 2.40 |
| Jobs | 219 | 57 | 37 | 313 | 1.43 |
| **Farmer-Retail Sales Direct Economic Values** | | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs | |
| Wisconsin | 215,646,314 | 34,210,846 | 49,901,698 | 1,259 | |
| **Farmer-Retail Sales Induced Economic Values** | | | | | |
| | | Labor Income | Value Added | Jobs | |
| Wisconsin | | 10,711,519 | 19,028,933 | 306 | |

**Scenario 2: Production for Major Metropolitan Areas**

| Fresh Fruit and Vegetable Production Outcomes | | | | |
|---|---|---|---|---|
| | Acres Required | Farm Value | Retail Value* | |
| Wisconsin | 21,911 | 72,118,432 | 91,917,105 | |
| **Farm-Level Total Economic Values for Selected Metropolitan Fruit and Vegetable Sales** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Wisconsin | 114,819,526 | 58,036,689 | 32,826,190 | 828 |
| **Farm-Level Total Economic Values of Corn and Soybean Production Considering Sales to Selected Metropolitan Areas** | | | | |
| | Output | Value Added | Labor Income | Jobs |
| Wisconsin | 30,144,690 | 13,944,100 | 4,212,337 | 196 |
| **Farmer-Retail Sales Direct Economic Values** | | | | |
| | Retail Sales | Labor Income | Value Added | Jobs |
| Wisconsin | 91,917,105 | 14,582,034 | 21,270,104 | 537 |
| **Farmer-Retail Sales Induced Economic Values** | | | | |
| | | Labor Income | Value Added | Jobs |
| Wisconsin | | 4,565,679 | 8,110,894 | 131 |

* *The state in which the sales occurred, not necessarily the state where farm production occurred*

## Appendix 2: Price Assumptions

| | Farm Price (CWT*) | Retail (CWT*) |
|---|---|---|
| Apricots | $ 43.94 | $ 246.69 |
| Asparagus | 93.96 | 121.07 |
| Bell Peppers | 40.37 | 122.96 |
| Broccoli | 35.82 | 113.42 |
| Cabbage | 14.72 | 40.53 |
| Cantaloupe | 19.22 | 75.48 |
| Carrots | 24.42 | 108.59 |
| Cauliflower | 39.69 | 141.26 |
| Collard Greens | 24.37 | 86.74 |
| Cucumbers | 24.47 | 87.51 |
| Eggplant | 31.95 | 74.15 |
| Garlic | 43.62 | 158.32 |
| Kale | 24.37 | 86.74 |
| Lettuce (Head) | 20.00 | 71.18 |
| Lettuce (Leaf) | 26.55 | 94.49 |
| Mustard Greens | 24.37 | 86.74 |
| Onions | 11.72 | 64.22 |
| Peaches | 37.58 | 160.15 |
| Pears | 29.00 | 136.24 |
| Plums | 35.25 | 154.00 |
| Raspberries | 102.13 | 453.60 |
| Snap Beans | 53.34 | 93.78 |
| Spinach | 33.30 | 118.53 |
| Squash | 30.55 | 143.48 |
| Strawberries | 74.45 | 330.66 |
| Sweet Potatoes | 22.15 | 78.85 |
| Tomatoes | 45.42 | 157.52 |
| Watermelon | 12.45 | 46.55 |

* *CWT = Per 100 pounds*

## Appendix 3: County Level Production Estimates for Scenario 2 Only

| FIPS | NAME | Average of Factors = Expected Farm Sales | Acres Required |
|---|---|---|---|
| 17001 | Adams | 607,583 | 159.7 |
| 17003 | Alexander | 5,787 | 1.5 |
| 17005 | Bond | 792,949 | 208.4 |
| 17007 | Boone | 2,998,117 | 788.1 |
| 17009 | Brown | 201,566 | 53.0 |
| 17011 | Bureau | 4,131,733 | 1,086.1 |
| 17013 | Calhoun | 443,366 | 116.6 |
| 17015 | Carroll | 1,649,127 | 433.5 |
| 17017 | Cass | 351,893 | 92.5 |
| 17019 | Champaign | 4,180,446 | 1,099.0 |
| 17021 | Christian | 827,700 | 217.6 |
| 17023 | Clark | 333,352 | 87.6 |
| 17025 | Clay | 441,723 | 116.1 |
| 17027 | Clinton | 1,087,658 | 285.9 |
| 17029 | Coles | 348,448 | 91.6 |
| 17031 | Cook | 2,569,036 | 675.3 |
| 17033 | Crawford | 226,306 | 59.5 |
| 17035 | Cumberland | 220,153 | 57.9 |
| 17037 | DeKalb | 6,600,710 | 1,735.2 |
| 17039 | De Witt | 68,605 | 18.0 |
| 17041 | Douglas | 1,776,084 | 466.9 |
| 17043 | DuPage | 1,120,759 | 294.6 |
| 17045 | Edgar | 592,068 | 155.6 |
| 17047 | Edwards | 333,118 | 87.6 |
| 17049 | Effingham | 631,912 | 166.1 |
| 17051 | Fayette | 805,422 | 211.7 |
| 17053 | Ford | 1,866,194 | 490.6 |
| 17055 | Franklin | 492,511 | 129.5 |
| 17057 | Fulton | 733,378 | 192.8 |
| 17059 | Gallatin | 64,458 | 16.9 |
| 17061 | Greene | 1,029,784 | 270.7 |
| 17063 | Grundy | 4,104,208 | 1,078.9 |
| 17065 | Hamilton | 328,178 | 86.3 |
| 17067 | Hancock | 195,830 | 51.5 |
| 17069 | Hardin | 4,182 | 1.1 |
| 17071 | Henderson | 109,976 | 28.9 |
| 17073 | Henry | 3,607,638 | 948.4 |
| 17075 | Iroquois | 6,323,953 | 1,662.4 |

| | | | |
|---|---|---|---|
| 17077 | Jackson | 471,819 | 124.0 |
| 17079 | Jasper | 642,984 | 169.0 |
| 17081 | Jefferson | 658,685 | 173.2 |
| 17083 | Jersey | 1,202,432 | 316.1 |
| 17085 | Jo Daviess | 340,790 | 89.6 |
| 17087 | Johnson | 16,308 | 4.3 |
| 17089 | Kane | 9,316,279 | 2,449.1 |
| 17091 | Kankakee | 7,712,966 | 2,027.6 |
| 17093 | Kendall | 6,980,913 | 1,835.1 |
| 17095 | Knox | 404,263 | 106.3 |
| 17097 | Lake | 3,311,028 | 870.4 |
| 17099 | La Salle | 7,693,410 | 2,022.4 |
| 17101 | Lawrence | 663,464 | 174.4 |
| 17103 | Lee | 4,180,118 | 1,098.9 |
| 17105 | Livingston | 5,369,307 | 1,411.5 |
| 17107 | Logan | 163,332 | 42.9 |
| 17109 | McDonough | 631,468 | 166.0 |
| 17111 | McHenry | 7,258,681 | 1,908.2 |
| 17113 | McLean | 4,140,992 | 1,088.6 |
| 17115 | Macon | 92,678 | 24.4 |
| 17117 | Macoupin | 1,479,234 | 388.9 |
| 17119 | Madison | 3,425,960 | 900.6 |
| 17121 | Marion | 690,480 | 181.5 |
| 17123 | Marshall | 1,505,173 | 395.7 |
| 17125 | Mason | 428,090 | 112.5 |
| 17127 | Massac | 14,908 | 3.9 |
| 17129 | Menard | 374,674 | 98.5 |
| 17131 | Mercer | 419,172 | 110.2 |
| 17133 | Monroe | 1,356,091 | 356.5 |
| 17135 | Montgomery | 861,950 | 226.6 |
| 17137 | Morgan | 863,355 | 227.0 |
| 17139 | Moultrie | 263,494 | 69.3 |
| 17141 | Ogle | 5,491,595 | 1,443.6 |
| 17143 | Peoria | 979,205 | 257.4 |
| 17145 | Perry | 407,243 | 107.1 |
| 17147 | Piatt | 1,583,841 | 416.4 |
| 17149 | Pike | 635,337 | 167.0 |
| 17151 | Pope | 7,369 | 1.9 |
| 17153 | Pulaski | 12,004 | 3.2 |
| 17155 | Putnam | 420,993 | 110.7 |
| 17157 | Randolph | 735,492 | 193.3 |
| 17159 | Richland | 371,197 | 97.6 |

| | | | |
|---|---|---|---|
| 17161 | Rock Island | 1,884,429 | 495.4 |
| 17163 | St. Clair | 2,650,844 | 696.9 |
| 17165 | Saline | 35,218 | 9.3 |
| 17167 | Sangamon | 1,153,881 | 303.3 |
| 17169 | Schuyler | 352,405 | 92.6 |
| 17171 | Scott | 384,951 | 101.2 |
| 17173 | Shelby | 722,631 | 190.0 |
| 17175 | Stark | 1,040,377 | 273.5 |
| 17177 | Stephenson | 3,460,685 | 909.7 |
| 17179 | Tazewell | 753,988 | 198.2 |
| 17181 | Union | 172,402 | 45.3 |
| 17183 | Vermilion | 3,593,901 | 944.8 |
| 17185 | Wabash | 159,971 | 42.1 |
| 17187 | Warren | 257,948 | 67.8 |
| 17189 | Washington | 851,966 | 224.0 |
| 17191 | Wayne | 565,960 | 148.8 |
| 17193 | White | 351,759 | 92.5 |
| 17195 | Whiteside | 3,722,444 | 978.6 |
| 17197 | Will | 23,217,341 | 6,103.4 |
| 17199 | Williamson | 241,047 | 63.4 |
| 17201 | Winnebago | 4,858,555 | 1,277.2 |
| 17203 | Woodford | 2,446,965 | 643.3 |

| FIPS | NAME | Average of Factors = Expected Farm Sales | Acres Required |
|---|---|---|---|
| 18001 | Adams | 2,510,763 | 764.2 |
| 18003 | Allen | 2,688,486 | 818.3 |
| 18005 | Bartholomew | 1,771,547 | 539.2 |
| 18007 | Benton | 1,691,502 | 514.9 |
| 18009 | Blackford | 551,122 | 167.7 |
| 18011 | Boone | 1,390,747 | 423.3 |
| 18013 | Brown | 306,136 | 93.2 |
| 18015 | Carroll | 1,446,473 | 440.3 |
| 18017 | Cass | 1,963,139 | 597.5 |
| 18019 | Clark | 1,858,732 | 565.8 |
| 18021 | Clay | 525,396 | 159.9 |
| 18023 | Clinton | 796,141 | 242.3 |
| 18025 | Crawford | 160,162 | 48.7 |
| 18027 | Daviess | 766,053 | 233.2 |
| 18029 | Dearborn | 1,490,261 | 453.6 |
| 18031 | Decatur | 1,917,465 | 583.6 |

| | | | |
|---|---|---|---|
| 18033 | DeKalb | 1,011,100 | 307.8 |
| 18035 | Delaware | 1,595,125 | 485.5 |
| 18037 | Dubois | 494,034 | 150.4 |
| 18039 | Elkhart | 4,462,383 | 1,358.2 |
| 18041 | Fayette | 1,080,744 | 329.0 |
| 18043 | Floyd | 822,285 | 250.3 |
| 18045 | Fountain | 1,093,639 | 332.9 |
| 18047 | Franklin | 1,387,680 | 422.4 |
| 18049 | Fulton | 1,930,573 | 587.6 |
| 18051 | Gibson | 462,051 | 140.6 |
| 18053 | Grant | 770,239 | 234.4 |
| 18055 | Greene | 973,097 | 296.2 |
| 18057 | Hamilton | 2,031,487 | 618.3 |
| 18059 | Hancock | 2,670,805 | 812.9 |
| 18061 | Harrison | 1,777,837 | 541.1 |
| 18063 | Hendricks | 2,853,242 | 868.5 |
| 18065 | Henry | 2,007,743 | 611.1 |
| 18067 | Howard | 808,166 | 246.0 |
| 18069 | Huntington | 995,709 | 303.1 |
| 18071 | Jackson | 1,850,799 | 563.3 |
| 18073 | Jasper | 2,979,214 | 906.8 |
| 18075 | Jay | 1,708,814 | 520.1 |
| 18077 | Jefferson | 1,304,395 | 397.0 |
| 18079 | Jennings | 1,499,606 | 456.4 |
| 18081 | Johnson | 2,568,562 | 781.8 |
| 18083 | Knox | 678,440 | 206.5 |
| 18085 | Kosciusko | 3,296,657 | 1,003.4 |
| 18087 | LaGrange | 3,092,728 | 941.3 |
| 18089 | Lake | 3,832,029 | 1,166.4 |
| 18091 | LaPorte | 4,014,571 | 1,221.9 |
| 18093 | Lawrence | 705,047 | 214.6 |
| 18095 | Madison | 2,365,321 | 719.9 |
| 18097 | Marion | 1,091,599 | 332.3 |
| 18099 | Marshall | 2,494,193 | 759.2 |
| 18101 | Martin | 151,107 | 46.0 |
| 18103 | Miami | 567,188 | 172.6 |
| 18105 | Monroe | 470,803 | 143.3 |
| 18107 | Montgomery | 649,746 | 197.8 |
| 18109 | Morgan | 2,047,077 | 623.1 |
| 18111 | Newton | 1,719,904 | 523.5 |
| 18113 | Noble | 961,241 | 292.6 |
| 18115 | Ohio | 317,888 | 96.8 |

| | | | |
|---|---|---|---|
| 18117 | Orange | 417,224 | 127.0 |
| 18119 | Owen | 635,329 | 193.4 |
| 18121 | Parke | 349,843 | 106.5 |
| 18123 | Perry | 158,728 | 48.3 |
| 18125 | Pike | 217,935 | 66.3 |
| 18127 | Porter | 2,601,231 | 791.8 |
| 18129 | Posey | 445,273 | 135.5 |
| 18131 | Pulaski | 1,780,778 | 542.0 |
| 18133 | Putnam | 1,008,045 | 306.8 |
| 18135 | Randolph | 1,950,398 | 593.7 |
| 18137 | Ripley | 2,520,397 | 767.1 |
| 18139 | Rush | 2,048,778 | 623.6 |
| 18141 | St. Joseph | 3,567,248 | 1,085.8 |
| 18143 | Scott | 814,123 | 247.8 |
| 18145 | Shelby | 2,473,442 | 752.9 |
| 18147 | Spencer | 318,821 | 97.0 |
| 18149 | Starke | 1,451,824 | 441.9 |
| 18151 | Steuben | 503,396 | 153.2 |
| 18153 | Sullivan | 240,501 | 73.2 |
| 18155 | Switzerland | 691,988 | 210.6 |
| 18157 | Tippecanoe | 1,992,689 | 606.5 |
| 18159 | Tipton | 869,792 | 264.7 |
| 18161 | Union | 700,473 | 213.2 |
| 18163 | Vanderburgh | 877,846 | 267.2 |
| 18165 | Vermillion | 263,984 | 80.4 |
| 18167 | Vigo | 405,995 | 123.6 |
| 18169 | Wabash | 643,232 | 195.8 |
| 18171 | Warren | 1,135,975 | 345.8 |
| 18173 | Warrick | 287,117 | 87.4 |
| 18175 | Washington | 1,284,487 | 391.0 |
| 18177 | Wayne | 2,167,919 | 659.9 |
| 18179 | Wells | 1,295,126 | 394.2 |
| 18181 | White | 2,364,036 | 719.6 |
| 18183 | Whitley | 861,333 | 262.2 |

| FIPS | NAME | Average of Factors = Expected Farm Sales | Acres Required |
|---|---|---|---|
| 19001 | Adair | 390,164 | 103.0 |
| 19003 | Adams | 149,222 | 39.4 |
| 19005 | Allamakee | 103,894 | 27.4 |
| 19007 | Appanoose | 55,814 | 14.7 |

| | | | |
|---|---|---|---|
| 19009 | Audubon | 326,786 | 86.3 |
| 19011 | Benton | 416,368 | 109.9 |
| 19013 | Black Hawk | 166,217 | 43.9 |
| 19015 | Boone | 454,073 | 119.9 |
| 19017 | Bremer | 57,975 | 15.3 |
| 19019 | Buchanan | 219,610 | 58.0 |
| 19021 | Buena Vista | 227,038 | 59.9 |
| 19023 | Butler | 172,572 | 45.6 |
| 19025 | Calhoun | 265,115 | 70.0 |
| 19027 | Carroll | 339,386 | 89.6 |
| 19029 | Cass | 376,610 | 99.4 |
| 19031 | Cedar | 302,867 | 79.9 |
| 19033 | Cerro Gordo | 782,036 | 206.4 |
| 19035 | Cherokee | 126,694 | 33.4 |
| 19037 | Chickasaw | 149,571 | 39.5 |
| 19039 | Clarke | 150,354 | 39.7 |
| 19041 | Clay | - | - |
| 19043 | Clayton | 243,549 | 64.3 |
| 19045 | Clinton | 2,875,037 | 758.9 |
| 19047 | Crawford | 349,669 | 92.3 |
| 19049 | Dallas | 1,614,450 | 426.1 |
| 19051 | Davis | 93,594 | 24.7 |
| 19053 | Decatur | 78,498 | 20.7 |
| 19055 | Delaware | 386,031 | 101.9 |
| 19057 | Des Moines | 137,646 | 36.3 |
| 19059 | Dickinson | - | - |
| 19061 | Dubuque | 357,174 | 94.3 |
| 19063 | Emmet | - | - |
| 19065 | Fayette | 221,056 | 58.3 |
| 19067 | Floyd | 36,144 | 9.5 |
| 19069 | Franklin | 143,358 | 37.8 |
| 19071 | Fremont | 223,577 | 59.0 |
| 19073 | Greene | 417,467 | 110.2 |
| 19075 | Grundy | 160,676 | 42.4 |
| 19077 | Guthrie | 471,781 | 124.5 |
| 19079 | Hamilton | 233,774 | 61.7 |
| 19081 | Hancock | 113,580 | 30.0 |
| 19083 | Hardin | 197,109 | 52.0 |
| 19085 | Harrison | 638,993 | 168.7 |
| 19087 | Henry | 130,993 | 34.6 |
| 19089 | Howard | 106,107 | 28.0 |
| 19091 | Humboldt | 92,736 | 24.5 |

| | | | |
|---|---|---|---|
| 19093 | Ida | 179,402 | 47.4 |
| 19095 | Iowa | 245,471 | 64.8 |
| 19097 | Jackson | 362,695 | 95.7 |
| 19099 | Jasper | 358,849 | 94.7 |
| 19101 | Jefferson | 116,011 | 30.6 |
| 19103 | Johnson | 416,370 | 109.9 |
| 19105 | Jones | 342,230 | 90.3 |
| 19107 | Keokuk | 192,903 | 50.9 |
| 19109 | Kossuth | 168,374 | 44.4 |
| 19111 | Lee | 135,173 | 35.7 |
| 19113 | Linn | 1,298,819 | 342.8 |
| 19115 | Louisa | 149,411 | 39.4 |
| 19117 | Lucas | 87,556 | 23.1 |
| 19119 | Lyon | - | - |
| 19121 | Madison | 893,480 | 235.8 |
| 19123 | Mahaska | 206,836 | 54.6 |
| 19125 | Marion | 245,805 | 64.9 |
| 19127 | Marshall | 207,067 | 54.7 |
| 19129 | Mills | 390,093 | 103.0 |
| 19131 | Mitchell | 691,949 | 182.6 |
| 19133 | Monona | 367,578 | 97.0 |
| 19135 | Monroe | 99,295 | 26.2 |
| 19137 | Montgomery | 233,819 | 61.7 |
| 19139 | Muscatine | 239,878 | 63.3 |
| 19141 | O'Brien | 132,018 | 34.8 |
| 19143 | Osceola | - | - |
| 19145 | Page | 235,666 | 62.2 |
| 19147 | Palo Alto | 87,810 | 23.2 |
| 19149 | Plymouth | 239,390 | 63.2 |
| 19151 | Pocahontas | 113,116 | 29.9 |
| 19153 | Polk | 1,064,814 | 281.1 |
| 19155 | Pottawattamie | 2,694,926 | 711.3 |
| 19157 | Poweshiek | 238,577 | 63.0 |
| 19159 | Ringgold | 133,274 | 35.2 |
| 19161 | Sac | 261,417 | 69.0 |
| 19163 | Scott | 1,943,875 | 513.1 |
| 19165 | Shelby | 444,009 | 117.2 |
| 19167 | Sioux | 246,487 | 65.1 |
| 19169 | Story | 380,802 | 100.5 |
| 19171 | Tama | 237,474 | 62.7 |
| 19173 | Taylor | 176,592 | 46.6 |
| 19175 | Union | 213,197 | 56.3 |

| | | | |
|---|---|---|---|
| 19177 | Van Buren | 78,138 | 20.6 |
| 19179 | Wapello | 130,788 | 34.5 |
| 19181 | Warren | 770,351 | 203.3 |
| 19183 | Washington | 259,673 | 68.5 |
| 19185 | Wayne | 62,478 | 16.5 |
| 19187 | Webster | 212,407 | 56.1 |
| 19189 | Winnebago | 509,797 | 134.6 |
| 19191 | Winneshiek | 143,570 | 37.9 |
| 19193 | Woodbury | 232,649 | 61.4 |
| 19195 | Worth | 505,108 | 133.3 |
| 19197 | Wright | 115,871 | 30.6 |

| FIPS | NAME | Average of Factors = Expected Farm Sales | Acres Required |
|---|---|---|---|
| 26001 | Alcona | 223,025 | 81.9 |
| 26003 | Alger | - | - |
| 26005 | Allegan | 4,265,229 | 1,567.1 |
| 26007 | Alpena | 15,877 | 5.8 |
| 26009 | Antrim | 43,313 | 15.9 |
| 26011 | Arenac | 739,006 | 271.5 |
| 26013 | Baraga | - | - |
| 26015 | Barry | 2,308,887 | 848.3 |
| 26017 | Bay | 2,168,277 | 796.6 |
| 26019 | Benzie | 48,391 | 17.8 |
| 26021 | Berrien | 4,836,183 | 1,776.8 |
| 26023 | Branch | 2,360,530 | 867.3 |
| 26025 | Calhoun | 2,678,024 | 983.9 |
| 26027 | Cass | 2,582,600 | 948.9 |
| 26029 | Charlevoix | - | - |
| 26031 | Cheboygan | - | - |
| 26033 | Chippewa | - | - |
| 26035 | Clare | 111,793 | 41.1 |
| 26037 | Clinton | 5,044,238 | 1,853.3 |
| 26039 | Crawford | 3,759 | 1.4 |
| 26041 | Delta | 15,928 | 5.9 |
| 26043 | Dickinson | 17,298 | 6.4 |
| 26045 | Eaton | 4,492,273 | 1,650.5 |
| 26047 | Emmet | - | - |
| 26049 | Genesee | 10,300,081 | 3,784.3 |
| 26051 | Gladwin | 526,168 | 193.3 |
| 26053 | Gogebic | - | - |

| | | | |
|---|---|---|---|
| 26055 | Grand Traverse | 154,829 | 56.9 |
| 26057 | Gratiot | 2,932,592 | 1,077.4 |
| 26059 | Hillsdale | 2,877,897 | 1,057.3 |
| 26061 | Houghton | - | - |
| 26063 | Huron | 3,924,738 | 1,442.0 |
| 26065 | Ingham | 5,945,746 | 2,184.5 |
| 26067 | Ionia | 3,652,538 | 1,342.0 |
| 26069 | Iosco | 335,809 | 123.4 |
| 26071 | Iron | 6,310 | 2.3 |
| 26073 | Isabella | 1,693,843 | 622.3 |
| 26075 | Jackson | 3,209,592 | 1,179.2 |
| 26077 | Kalamazoo | 2,633,534 | 967.6 |
| 26079 | Kalkaska | 36,770 | 13.5 |
| 26081 | Kent | 4,074,697 | 1,497.1 |
| 26083 | Keweenaw | - | - |
| 26085 | Lake | 48,014 | 17.6 |
| 26087 | Lapeer | 8,510,070 | 3,126.6 |
| 26089 | Leelanau | 109,723 | 40.3 |
| 26091 | Lenawee | 4,385,337 | 1,611.2 |
| 26093 | Livingston | 3,707,400 | 1,362.1 |
| 26095 | Luce | - | - |
| 26097 | Mackinac | - | - |
| 26099 | Macomb | 4,217,165 | 1,549.4 |
| 26101 | Manistee | 70,740 | 26.0 |
| 26103 | Marquette | 4,896 | 1.8 |
| 26105 | Mason | 229,000 | 84.1 |
| 26107 | Mecosta | 373,239 | 137.1 |
| 26109 | Menominee | 63,887 | 23.5 |
| 26111 | Midland | 1,084,498 | 398.4 |
| 26113 | Missaukee | 120,732 | 44.4 |
| 26115 | Monroe | 4,875,840 | 1,791.4 |
| 26117 | Montcalm | 2,746,962 | 1,009.2 |
| 26119 | Montmorency | - | - |
| 26121 | Muskegon | 623,436 | 229.1 |
| 26123 | Newaygo | 819,696 | 301.2 |
| 26125 | Oakland | 6,348,949 | 2,332.6 |
| 26127 | Oceana | 465,038 | 170.9 |
| 26129 | Ogemaw | 30,921 | 11.4 |
| 26131 | Ontonagon | - | - |
| 26133 | Osceola | 279,741 | 102.8 |
| 26135 | Oscoda | 2,935 | 1.1 |
| 26137 | Otsego | - | - |

| | | | |
|---|---|---|---|
| 26139 | Ottawa | 3,667,099 | 1,347.3 |
| 26141 | Presque Isle | - | - |
| 26143 | Roscommon | 8,143 | 3.0 |
| 26145 | Saginaw | 4,762,178 | 1,749.6 |
| 26147 | St. Clair | 4,068,836 | 1,494.9 |
| 26149 | St. Joseph | 2,545,280 | 935.1 |
| 26151 | Sanilac | 4,945,193 | 1,816.9 |
| 26153 | Schoolcraft | - | - |
| 26155 | Shiawassee | 4,820,722 | 1,771.1 |
| 26157 | Tuscola | 5,464,759 | 2,007.8 |
| 26159 | Van Buren | 3,680,138 | 1,352.1 |
| 26161 | Washtenaw | 6,360,136 | 2,336.7 |
| 26163 | Wayne | 2,198,144 | 807.6 |
| 26165 | Wexford | 61,916 | 22.7 |

| FIPS | NAME | Average of Factors = Expected Farm Sales | Acres Required |
|---|---|---|---|
| 27001 | Aitkin | 455,997 | 147.5 |
| 27003 | Anoka | 2,643,054 | 854.8 |
| 27005 | Becker | - | - |
| 27007 | Beltrami | 204,573 | 66.2 |
| 27009 | Benton | 633,567 | 204.9 |
| 27011 | Big Stone | - | - |
| 27013 | Blue Earth | 930,919 | 301.1 |
| 27015 | Brown | 610,295 | 197.4 |
| 27017 | Carlton | 445,588 | 144.1 |
| 27019 | Carver | 1,599,090 | 517.2 |
| 27021 | Cass | 179,018 | 57.9 |
| 27023 | Chippewa | 575,818 | 186.2 |
| 27025 | Chisago | 1,481,325 | 479.1 |
| 27027 | Clay | - | - |
| 27029 | Clearwater | - | - |
| 27031 | Cook | 518 | 0.2 |
| 27033 | Cottonwood | - | - |
| 27035 | Crow Wing | 308,394 | 99.7 |
| 27037 | Dakota | 4,319,263 | 1,396.9 |
| 27039 | Dodge | 743,020 | 240.3 |
| 27041 | Douglas | - | - |
| 27043 | Faribault | 828,909 | 268.1 |
| 27045 | Fillmore | 658,498 | 213.0 |
| 27047 | Freeborn | 947,779 | 306.5 |

| | | | |
|---|---|---|---|
| 27049 | Goodhue | 1,531,701 | 495.4 |
| 27051 | Grant | - | - |
| 27053 | Hennepin | 3,383,474 | 1,094.2 |
| 27055 | Houston | 55,027 | 17.8 |
| 27057 | Hubbard | 150,263 | 48.6 |
| 27059 | Isanti | 1,689,943 | 546.5 |
| 27061 | Itasca | 389,495 | 126.0 |
| 27063 | Jackson | - | - |
| 27065 | Kanabec | 720,804 | 233.1 |
| 27067 | Kandiyohi | 904,468 | 292.5 |
| 27069 | Kittson | - | - |
| 27071 | Koochiching | 19,926 | 6.4 |
| 27073 | Lac qui Parle | 495,148 | 160.1 |
| 27075 | Lake | 42,299 | 13.7 |
| 27077 | Lake of the Woods | - | - |
| 27079 | Le Sueur | 908,457 | 293.8 |
| 27081 | Lincoln | - | - |
| 27083 | Lyon | - | - |
| 27085 | McLeod | 1,212,969 | 392.3 |
| 27087 | Mahnomen | - | - |
| 27089 | Marshall | - | - |
| 27091 | Martin | - | - |
| 27093 | Meeker | 1,168,396 | 377.9 |
| 27095 | Mille Lacs | 589,889 | 190.8 |
| 27097 | Morrison | 645,340 | 208.7 |
| 27099 | Mower | 948,642 | 306.8 |
| 27101 | Murray | - | - |
| 27103 | Nicollet | 667,555 | 215.9 |
| 27105 | Nobles | - | - |
| 27107 | Norman | - | - |
| 27109 | Olmsted | 790,972 | 255.8 |
| 27111 | Otter Tail | - | - |
| 27113 | Pennington | - | - |
| 27115 | Pine | 811,984 | 262.6 |
| 27117 | Pipestone | - | - |
| 27119 | Polk | - | - |
| 27121 | Pope | 407,537 | 131.8 |
| 27123 | Ramsey | 462,945 | 149.7 |
| 27125 | Red Lake | - | - |
| 27127 | Redwood | 795,021 | 257.1 |
| 27129 | Renville | 1,194,399 | 386.3 |
| 27131 | Rice | 1,720,870 | 556.5 |

| | | | |
|---|---|---|---|
| 27133 | Rock | - | - |
| 27135 | Roseau | - | - |
| 27137 | St. Louis | 1,599,033 | 517.1 |
| 27139 | Scott | 1,548,369 | 500.8 |
| 27141 | Sherburne | 932,573 | 301.6 |
| 27143 | Sibley | 1,048,000 | 338.9 |
| 27145 | Stearns | 1,892,267 | 612.0 |
| 27147 | Steele | 934,421 | 302.2 |
| 27149 | Stevens | - | - |
| 27151 | Swift | 538,021 | 174.0 |
| 27153 | Todd | 453,405 | 146.6 |
| 27155 | Traverse | - | - |
| 27157 | Wabasha | 521,778 | 168.7 |
| 27159 | Wadena | - | - |
| 27161 | Waseca | 698,522 | 225.9 |
| 27163 | Washington | 3,233,089 | 1,045.6 |
| 27165 | Watonwan | 420,848 | 136.1 |
| 27167 | Wilkin | - | - |
| 27169 | Winona | 406,847 | 131.6 |
| 27171 | Wright | 2,375,336 | 768.2 |
| 27173 | Yellow Medicine | - | - |

| FIPS | NAME | Average of Factors = Expected Farm Sales | Acres Required |
|---|---|---|---|
| 55001 | Adams | 218,972 | 66.5 |
| 55003 | Ashland | 81,139 | 24.7 |
| 55005 | Barron | 796,551 | 242.0 |
| 55007 | Bayfield | 183,567 | 55.8 |
| 55009 | Brown | 1,153,080 | 350.3 |
| 55011 | Buffalo | 435,516 | 132.3 |
| 55013 | Burnett | 487,649 | 148.2 |
| 55015 | Calumet | 647,518 | 196.7 |
| 55017 | Chippewa | 769,778 | 233.9 |
| 55019 | Clark | 829,443 | 252.0 |
| 55021 | Columbia | 1,254,478 | 381.1 |
| 55023 | Crawford | 365,366 | 111.0 |
| 55025 | Dane | 4,707,265 | 1,430.1 |
| 55027 | Dodge | 2,313,666 | 702.9 |
| 55029 | Door | 198,774 | 60.4 |
| 55031 | Douglas | 216,978 | 65.9 |
| 55033 | Dunn | 1,123,643 | 341.4 |

| | | | |
|---|---|---|---|
| 55035 | Eau Claire | 490,066 | 148.9 |
| 55037 | Florence | 9,193 | 2.8 |
| 55039 | Fond du Lac | 1,416,683 | 430.4 |
| 55041 | Forest | 13,446 | 4.1 |
| 55043 | Grant | 1,031,389 | 313.4 |
| 55045 | Green | 2,720,053 | 826.4 |
| 55047 | Green Lake | 470,861 | 143.1 |
| 55049 | Iowa | 668,056 | 203.0 |
| 55051 | Iron | - | - |
| 55053 | Jackson | 40,972 | 12.4 |
| 55055 | Jefferson | 3,669,030 | 1,114.7 |
| 55057 | Juneau | 238,668 | 72.5 |
| 55059 | Kenosha | 2,276,732 | 691.7 |
| 55061 | Kewaunee | 467,184 | 141.9 |
| 55063 | La Crosse | 60,551 | 18.4 |
| 55065 | Lafayette | 753,049 | 228.8 |
| 55067 | Langlade | 60,690 | 18.4 |
| 55069 | Lincoln | 41,172 | 12.5 |
| 55071 | Manitowoc | 896,416 | 272.3 |
| 55073 | Marathon | 450,125 | 136.8 |
| 55075 | Marinette | 143,372 | 43.6 |
| 55077 | Marquette | 390,274 | 118.6 |
| 55078 | Menominee | 549 | 0.2 |
| 55079 | Milwaukee | 788,526 | 239.6 |
| 55081 | Monroe | 138,428 | 42.1 |
| 55083 | Oconto | 1,523,783 | 462.9 |
| 55085 | Oneida | 7,355 | 2.2 |
| 55087 | Outagamie | 1,080,424 | 328.3 |
| 55089 | Ozaukee | 1,547,663 | 470.2 |
| 55091 | Pepin | 260,758 | 79.2 |
| 55093 | Pierce | 1,360,442 | 413.3 |
| 55095 | Polk | 1,854,836 | 563.5 |
| 55097 | Portage | 263,941 | 80.2 |
| 55099 | Price | - | - |
| 55101 | Racine | 3,447,921 | 1,047.5 |
| 55103 | Richland | 529,949 | 161.0 |
| 55105 | Rock | 4,458,930 | 1,354.7 |
| 55107 | Rusk | 203,517 | 61.8 |
| 55109 | St. Croix | 2,667,548 | 810.4 |
| 55111 | Sauk | 1,095,276 | 332.8 |
| 55113 | Sawyer | 165,266 | 50.2 |
| 55115 | Shawano | 810,235 | 246.2 |

| | | | |
|---|---|---|---|
| 55117 | Sheboygan | 2,756,596 | 837.5 |
| 55119 | Taylor | 542,343 | 164.8 |
| 55121 | Trempealeau | 403,656 | 122.6 |
| 55123 | Vernon | 283,957 | 86.3 |
| 55125 | Vilas | - | - |
| 55127 | Walworth | 3,204,074 | 973.4 |
| 55129 | Washburn | 402,039 | 122.1 |
| 55131 | Washington | 3,826,054 | 1,162.4 |
| 55133 | Waukesha | 4,489,302 | 1,363.9 |
| 55135 | Waupaca | 642,706 | 195.3 |
| 55137 | Waushara | 360,242 | 109.4 |
| 55139 | Winnebago | 728,992 | 221.5 |
| 55141 | Wood | 181,759 | 55.2 |