Northwest Michigan's Farm Factor

Economic Impacts, Challenges, and Opportunities

February 2009

Agriculture contributes substantially to the economy of the six-county northwest Lower Michigan region. Ample opportunities also exist to significantly expand its economic footprint.

Michigan Land Use Institute

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Executive Summary

This report documents the economic impact of agriculture in a six-county region of Michigan's northwest Lower Peninsula,[1] explores opportunities for improving farm profitability as a means of maintaining the economic and other benefits associated with agriculture, and describes the resources available in the region to exploit these opportunities.

Key findings include:

- Agriculture contributes as much as $97.7 million annually to the local economy in the form of agricultural products sold. It employs more than 2,000 farm proprietors with net farm earnings of $6.6 million and more than 3,000 workers with a total payroll of $12.8 million.
- If indirect impacts are included (i.e., the backward linked impacts of agriculture on other businesses), the total annual economic impact may be as high $138.9 million.
- Agriculture is not the largest economic sector in the region but it is locally important. Sales of agricultural products are one-half of those for retail trade and over a third the size of sales in the manufacturing sector.
- In terms of its share of economic activity, agriculture is four times more important to the region than it is to the state as a whole.
- Substantial opportunities exist to increase farm profitability by tapping into higher-value fresh markets, both direct and wholesale. By increasing sales of agricultural products to fresh markets, the region's farmers could increase farm revenue by $2.9 million (by increasing fresh sales by 50 percent) to $11.6 million (by tripling fresh sales.)
- Local consumption of fresh grapes, pears, raspberries, blueberries, apricots, onions, greens, and many other vegetables appear to exceed local production by substantial margins thus creating opportunities to grow new products for the local market.
- Local farmers grow enough of some products (i.e., asparagus, cucumbers, and tomatoes) to satisfy local fresh demand but appear to satisfy processing markets first leaving unmet some of the fresh market demand. These situations create an opportunity to shift products from low-valued processing markets to higher-value fresh markets.
- For some products (i.e., apples, strawberries, potatoes, snap beans, and tomatoes) local direct sales fall far below fresh consumption. These situations represent opportunities for local farmers to shift sales from processing or wholesale markets to high-value direct sales.
- The region has the agricultural resources to exploit many of these opportunities. It is blessed with a climate ideally suited to fruit production and consequently contains 80 percent of the state's sweet cherry orchard acres, 52 percent of tart cherries, 34 percent of plums and prunes, and 10 percent of apples.

- The region enjoys an active tourism industry that brings in as many as 1.4 million visitors annually, many of whom drive around the countryside and purchase agricultural products.
- The region's farmers are entrepreneurially oriented. More than 12 percent of farms in the region sold some products directly to consumers in 2007 compared to only 9 percent statewide. More than 6 percent of the region's farms produced and sold value-added commodities in 2007 compared to 4 percent statewide.
- High land values brought about by rapid population growth represent a real threat to the agricultural land base and industry in the region. Increasing the profitability of farms can help agriculture compete better against development for the land base, improve incomes for farm families, attract new farmers to farming, and help preserve the amenities agriculture provides to the region's residents.

I. Introduction

While agriculture does not dominate the landscape of northwest Michigan in the way it does the southern part of the state, it is nevertheless an important component of the local economy and quality of life. Many farms in the region, however, are struggling economically. The poor economic performance of some farms coupled with the region's rapid population growth has put pressure on farmland to be converted to more lucrative (in the short run) rural housing sites. The subsequent loss of farmland threatens the sustainability of the region's agricultural industry and the quality-of-life and other amenities it provides.

Making agriculture more profitable is one path to slowing the loss of farmland. Over the past five years, the Michigan Land Use Institute has been among those working to improve the economics of farming in northwest Lower Michigan. Its efforts have focused on fostering entrepreneurial activity in agriculture, expanding high-value markets, and addressing some of the constraints to improved agricultural profitability. As part of that effort, this report estimates the current contribution of agriculture to the region's economy, examines some of the opportunities that exist for local farmers to increase sales to high-value fresh markets, and outlines some of the challenges confronting agriculture in serving these markets into the future.

Key conclusions of the report include:

- Agriculture contributes as much as $97.7 million annually to the local economy. When indirect impacts are included, the total annual impact may be as high as $138.9 million.
- The region is four times more dependent on agriculture than is the state as a whole.
- Agriculture sales in the region are equal to the value of sales in the professional services sector and amount to approximately half of all retail sales in the region and one-third of sales in manufacturing.

- The region has a comparative advantage in producing fruit, and fruit accounts for almost half of direct impacts of agriculture compared to six percent for the state as a whole.
- Substantial opportunities exist for the region's farmers to capture larger portions of high-value fresh (direct and wholesale) markets in a number of key products. Opportunities exist to expand local fresh sales of existing and new products and also to expand marketing of fresh products outside the region.
- Increasing sales of fresh fruits and vegetables by 50 percent up to 200 percent may increase annual farm revenue in the region by between $1.3 and $11.6 million, depending on the size of the increase.
- The loss of farmland to residential use, and the consequent fragmentation of farmland, may pose one of the greater risks to the future of agriculture in the region and the contribution it makes to the economy and quality of life of area residents.

The remainder of the report first derives estimates of the economic impact of agriculture in the six-county region of interest (i.e., Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau, and Wexford counties). It then develops estimates of local agricultural production and compares them to estimates of fresh food consumption to identify opportunities for the region's farmers to tap into existing high-value fresh markets. The final section reviews some of the challenges facing the region's farmers.

II. Agriculture and the Region's Economy

Agriculture makes a substantial contribution to Michigan's economy. Michigan State University (MSU) researchers estimated that the state's agri-food/agri-energy system generated $63.7 billion in economic activity and supported 1.05 million jobs in 2006 (Peterson, Knudson, and Abate 2008). This figure represents 17 percent of Michigan's 2006 gross state product[2] and likely positions the agri-food system second only to the automobile industry as a primary production sector.

The MSU estimate encompasses not only the direct production of agricultural products (i.e., farming) but also related activity in industries that process and sell agricultural products. For each of these industries, the study estimated direct and indirect impacts. Direct impacts are the immediate effects of an activity on revenue and employment in an economy. For example, the direct impacts of farming are the gross revenue from the sale of agricultural products and wages paid to farm labor. Indirect impacts are the effects of activity in one industry on the industries that support it. For example, the value of sales of agricultural inputs (e.g., fertilizer, seed, pesticides, fuel, etc.) are indirect impacts of farming. Table 1 summarizes the statewide economic impact estimates from the MSU study.

Table 1. Economic Impacts of Michigan's Agri-Food/Agri-Energy System, 2006

Category	Economic impacts ($ millions)			
	Direct	Indirect	Total	Percent of total
Farming	$5,110	$2,012	$7,122	11.2%
Other agri-food (processing, wholesaling, retailing)	$32,907	$23,075	$55,982	87.9%
Total agri-food	**$38,017**	**$25,087**	**$63,104**	**99.1%**
Ethanol production	$378	$216	$594	0.9%
Grand total	**$38,395**	**$25,303**	**$63,698**	

Source: Michigan State Universtiy, Product Center for Agriculture and Natural Resources, 2008.

Food production (i.e., farming) accounts for only 11.2 percent of the total impact while food processing, wholesaling, and retailing account for 87.9 percent. Nevertheless, farming alone contributed over $7 billion to Michigan's economy in 2006. The total impact of farming thus represented 1.9 percent of Michigan's estimated $375.8 billion gross state product in 2006. The remainder of this report focuses on the economic impacts associated with farming.

This report describes the agricultural industry in a six-county region in Michigan's northwest Lower Peninsula.[2] Because complete and current economic data are less available for counties than for states, the methods used by MSU to estimate statewide economic impacts are not particularly applicable to a regional analysis. In particular, the USDA provides annual estimates of agricultural production only at the state level and publishes comprehensive county-level data at five-year intervals coinciding with the Census of Agriculture. The most recent Census of Agriculture data are from 2002[3].

The analysis of economic impacts combines current state-level data from the annual Michigan Agricultural Statistics[4] with older county-level data from the Census of Agriculture[5] to determine the six-county region's share of the $7.122 billion statewide impact of farming. Specifically, it:

- Updates the MSU statewide estimates to include 2007 data. The statewide estimates of direct economic impact thus represent the market value of sales of agricultural products averaged over 2005, 2006, and 2007.[6]
- Estimates the six-county region's average share of production over the last three Census of Agriculture years, 1992, 1997, and 2002. Depending on the nature of the data available, the shares represent the region's share of sales, quantity produced, or acres harvested.
- Multiplies the current statewide sales estimates by the historic average share of production for the six-county region to derive estimates of current (2007) direct impacts.

Table 2 summarizes the resulting estimates of direct and total (direct plus indirect) annual impacts of agricultural production for both the entire state and for the six-county region.

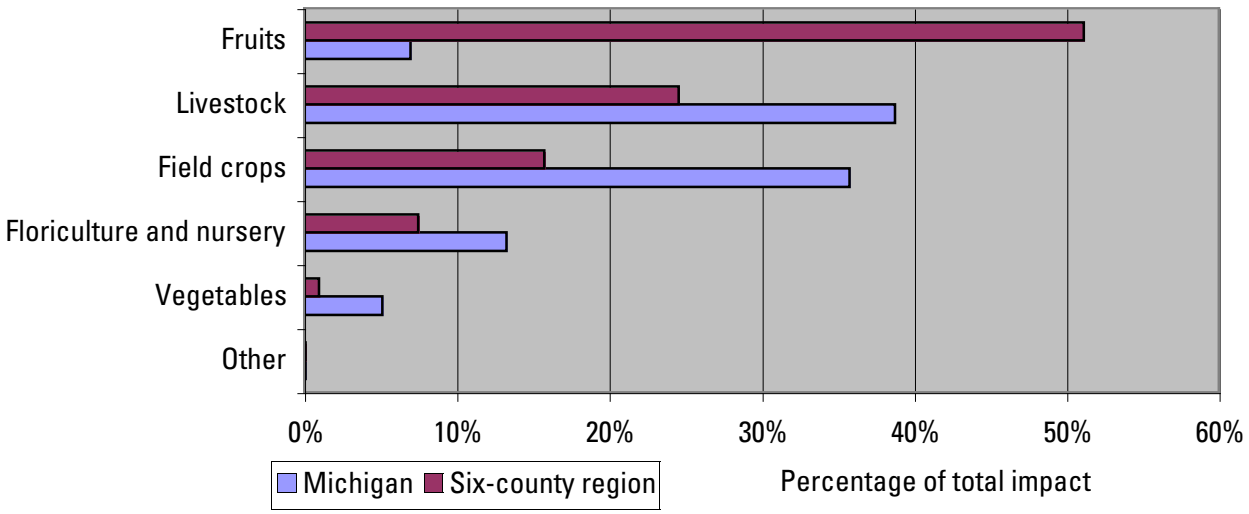
Table 2. Economic Impacts of Agricultural Production

	Michigan		Six-county region				
Product category	Direct impact ($1,000)	% of statewide impact	Direct impact ($1,000)	% of regional impact	Multiplier	Indirect impact ($1,000)	Total impact ($1,000)
Field crops	$2,247,328	41.7%	$17,984	18.4%	1.28	$5,035	$23,019
Fruit	$351,337	6.5%	$46,277	47.4%	1.44	$20,362	$66,639
Vegetables	$208,007	3.9%	$1,366	1.4%	1.32	$437	$1,803
Livestock	$1,917,216	35.5%	$23,892	24.4%	1.45	$10,751	$34,643
Floriculture and nursery	$670,520	12.4%	$8,207	8.4%	1.56	$4,596	$12,803
Total	**$5,394,407**		**$97,725**			**$41,181**	**$138,906**

Note: Appendix A provides additional detail within each of the broad categories presented in this table.

Agriculture contributed an estimated $97.7 million in direct impacts to the economy of the six-county region in 2007. In terms of market value, the region accounts for 1.8 percent of the agricultural production in the state. Fruit accounts for almost half of the direct impact making it the single largest segment of the regional agricultural sector. Livestock and field crops, respectively, have the second and third largest direct impact in the region. The region differs markedly from the state as a whole where field crops account for the single largest share of direct impact followed by livestock. Fruit accounts for only 6.5 percent of the direct impacts in the state as a whole. Figure 1 illustrates the relative importance of the five key agricultural product classes to direct and total economic impact in the region.

Figure 1. Direct Economic Impact by Product Class



Indirect Impacts and Data Limitations

Estimates of the direct impacts of agriculture in the six-county region likely underestimate actual impacts because the Census of Agriculture does not report county-level data when the data could reveal information about a specific farm. The resulting gaps in the data result in under reporting of sales at the county level. The gaps are particularly prevalent in small counties like those in the six-county region.

The gaps in county-level data make it difficult to accurately estimate indirect impacts at a regional level. The indirect impact of agriculture is the economic activity (sales) of other firms that depend on agriculture. For instance, the value of sales of agricultural fertilizer is an indirect impact of agriculture as is the value of sales of input suppliers to the fertilizer industry and so on. Sales of related industries represent regional impacts only if they accrue to firms within the region of interest. Otherwise, they "leak" from the regional economy. Economic impact models use region-specific multipliers that quantify the dollar value of sales in related industries within the region generated by a dollar of sales in agriculture. If data on the interactions or resource flows between economic sectors are concealed to protect the identity of specific firms, then the data necessary to develop multipliers are incomplete and the multipliers will not accurately reflect indirect impacts.

This report uses the multipliers developed for the entire state to estimate indirect impacts for the six-county region. This approach almost certainly overstates indirect impacts because the six-county region's economy likely experiences greater leakage than does the state's economy. The estimates of indirect impact presented in Table 2 thus represent an upper bound on indirect impacts in the six-county region. Agriculture may thus have generated as much as $41.2 million in related economic activity for a total economic impact of $138.9 million in the six-county region.

Agricultural Employment

Employment is another facet of local economic impact. The 2002 Census of Agriculture reported 2,051 farm proprietors in the region who employed 3,083 workers.[7] The Bureau of Economic Analysis (BEA) reported $6.6 million in net farm proprietor income and an additional $12.8 million in wages paid to hired farm workers for a total of $19.4 million in incomes related to farming in 2006.[8] Agricultural proprietors and employees spend some of their earnings at other businesses in the region and thus contribute to the earnings of the owners and employees of those businesses. These individuals, in turn, spend some of their earnings at other local businesses and so on thus extending the chain of impacts associated with incomes derived from agriculture. The multipliers used to estimate indirect impacts account for these "induced" impacts of agricultural activity.

III. Opportunities in Agriculture

While farming contributes substantially to the economy of the six-county region, many farmers are struggling. In each of the past three Censuses of Agriculture a majority of the region's farms reported net losses from farming: 56.5 percent in 1992, 50.8 percent in 1997, and 61.0 percent in 2002. Per farm losses averaged between $6,600 and $15,900. In 2002, 59.1 percent of the region's farmers worked off the farm implying that agriculture alone does not support many farm families.

The poor economic performance of many farms threatens the future of the region's agricultural industry and places at risk the benefits farming provides to the region. Rapid population growth in the region puts pressure on farmland for rural building sites. If farming is not profitable, more land is likely to transition out of agricultural use to higher value residential use. This transition will put additional pressure on remaining farms and on agricultural support industries. The loss of farmland also diminishes the scenic beauty of the region. Several surveys in the northwest Michigan region suggest that agricultural landscapes are an important element of the quality of life that residents value highly.[9] The scenic beauty associated with agricultural landscapes also attracts tourists to the region thus supporting another economically important sector of the region's economy.[10]

Improving the economics of farming in the region may help preserve the economic and other benefits associated with agriculture. It may ease pressures on farmers, reduce the pace of farmland conversion, encourage new farmers to begin farming, and contribute to economic growth in agriculture and other sectors of the regional economy that depend on agriculture.

General strategies for increasing farm profitability include increasing production of existing agriculture products, growing different products that have higher values, or increasing sales of existing products into higher value markets. The Michigan Land Use Institute's Entrepreneurial Agriculture Program has focused on a strategy of expanding direct and value-added marketing opportunities for farmers. The region's comparative advantage in fruit production and the potential of relatively high-value fresh markets has focused much of the attention on expanding fresh (direct and wholesale) markets for fruit and vegetables. Efforts have necessarily also included addressing constraints in the capacity to process, package, distribute, market, etc. fresh fruits and vegetables.

The remainder of this section explores the specific opportunities for expanding sales of local fruit and vegetable products to relatively high-value fresh markets, both direct and wholesale. Opportunities for increasing sales of fresh agricultural products exist when (a) local consumption exceeds local production, (b) local growers can expand into fresh markets outside the region, or (c) local growers can capture local market share from products that are imported into the region from elsewhere (e.g., local apples or potatoes displace imported products used in local schools). This section derives estimates of local production of fruits and vegetables in the six-county region and the quantity sold to fresh markets (direct and wholesale) and compares these production estimates to estimates of consumption both within the region (as an estimate of the potential of local markets) and within the state (as an estimate of opportunities beyond the region.)

Production and Marketing of Fruits and Vegetables

The 2002 Census of Agriculture provides the most recent county-level data on fruit and vegetable production in Michigan.[11] This report derives current production estimates for the six-county region by multiplying current (averages over 2005, 2006, and 2007) statewide data on sales to both fresh and processing markets as reported in the 2007/08 Michigan Agriculture Statistics[12] by the six-county region's share of harvested acres for each crop as reported in the 2002 Census of Agriculture.[13] Tables 3 and 4 summarize estimates of the quantities of selected vegetables and fruit, respectively, marketed to fresh and processing markets in the six-county region in 2007. Tables 5 and 6 summarize corresponding estimates of the value of sales.

Table 3. Vegetable Production in Michigan and Six-County Region, 2007

Michigan				Six-county region			
Production (1,000 lbs)				% of harvested acres	Production (1,000 lbs)		
	Total	Fresh	Processed		Total	Fresh	Processed
Potatoes	1,220,000	270,000	950,000	2.8%	34,253	7,580	26,672
Cucumbers	410,400	93,600	316,800	0.1%	378	86	292
Tomatoes	282,300	42,900	239,400	0.3%	981	149	832
Carrots	225,000	108,000	117,000	0.0%	37	18	19
Beans, snap	142,480	22,600	119,880	1.5%	2,207	350	1,857
Squash, winter	127,760	37,700	90,060		0	0	0
Celery	92,000	47,900	44,100	0.0%	0	0	0
Cabbage	81,700	63,000	18,700	0.0%	0	0	0
Corn, sweet	80,000	80,000		2.8%	2,249	2,249	0
Onions, dry	75,400	75,400		0.1%	51	51	0
Pumpkins	75,400	75,400		1.9%	1,434	1,434	0
Squash, summer	46,250	29,250	17,000		0	0	0
Peppers, bell	36,400	36,400		0.0%	0	0	0
Asparagus	23,200	5,800	17,400	0.1%	14	4	11
Peppers, other	19,800	6,300	13,500		0	0	0
Radishes	14,280	14,280		0.0%	0	0	0
Peas, green	11,548	108	11,440	0.3%	40	0	40
Cantaloups	10,450	10,450		0.0%	0	0	0
Turnips	10,360	10,360		0.0%	0	0	0
Greens	9,900	9,900			0	0	0
Watermelons	9,600	9,600		0.0%	0	0	0
Eggplant	4,620	4,620		0.0%	0	0	0
Beets, red	3,770	3,770		0.0%	0	0	0
Cauliflower	1,600	1,600		0.0%	0	0	0
Broccoli	390	390		2.8%	11	11	0
All vegetables	**3,014,608**	**1,059,328**	**1,955,280**		**41,656**	**11,933**	**29,723**

SOURCE: Vegetable inventory 2005-06, Michigan Rotational Survey

Table 4. Fruit Production in Michigan and Six-County Region, 2007

	Michigan			Six-county region			
	Production (1,000 lbs)			% of harvested acres	Production (1,000 lbs)		
	Total	Fresh	Processed		Total	Fresh	Processed
Apples	800,000	275,000	525,000	9.5%	76,016	26,130	49,885
Cherries, tart	177,360	500	176,860	51.7%	91,779	259	91,520
Blueberries	78,200	28,800	49,400	0.0%	0	0	0
Cherries, sweet	44,800	1,360	43,440	79.9%	35,774	1,086	34,688
Peaches	36,450	21,675	14,775	3.0%	1,110	660	450
Strawber-ries	9,410	4,620	4,790	3.2%	297	146	151
Plums	5,200	1,840	3,360	34.5%	1,793	634	1,158
All fruit	**1,151,420**	**333,795**	**817,625**		**206,768**	**28,916**	**177,853**

NOTE: Fruit production and values are averages for 2003-2007.
SOURCE: 2007 Michigan Agricultural Statistics

Table 5. Value of Vegetable Production in Michigan and Six-County Region, 2007

Michigan				Six-county region			
Value of production ($1,000)				% of harvested acres	Value of production ($1,000)		
	Total	Fresh	Processed		Total	Fresh	Processed
Potatoes	$87,685	$21,660	$66,025	2.8%	$2,462	$608	$1,854
Cucumbers	$41,587	$14,976	$26,611	0.1%	$38	$14	$25
Tomatoes	$25,399	$16,302	$9,097	0.3%	$88	$57	$32
Beans, snap	$23,150	$13,560	$9,590	1.5%	$359	$210	$149
Carrots	$18,747	$15,120	$3,627	0.0%	$3	$3	$1
Corn, sweet	$16,000	$16,000		2.8%	$450	$450	$0
Asparagus	$12,006	$3,654	$8,352	0.1%	$7	$2	$5
Celery	$10,493	$7,185	$3,308	0.0%	$0	$0	$0
Squash, winter	$9,144	$7,163	$1,981		$0	$0	$0
Onions, dry	$9,048	$9,048		0.1%	$6	$6	$0
Pumpkins	$9,048	$9,048		1.9%	$172	$172	$0
Peppers, bell	$8,736	$8,736		0.0%	$0	$0	$0
Squash, summer	$7,197	$6,143	$1,054		$0	$0	$0
Cabbage	$5,355	$5,355		0.0%	$0	$0	$0
Radishes	$4,998	$4,998		0.0%	$0	$0	$0
Peppers, other	$3,983	$1,890	$2,093		$0	$0	$0
Greens	$2,475	$2,475			$0	$0	$0
Cantaloups	$2,404	$2,404		0.0%	$0	$0	$0
Turnips	$1,450	$1,450		0.0%	$0	$0	$0
Peas, green	$1,388	$130	$1,258	0.3%	$5	$0	$4
Watermelons	$1,152	$1,152		0.0%	$0	$0	$0
Eggplant	$1,109	$1,109		0.0%	$0	$0	$0
Beets, red	$679	$679		0.0%	$0	$0	$0
Cauliflower	$480	$480		0.0%	$0	$0	$0
Broccoli	$293	$293		2.8%	$8	$8	$0
All vegetables	**$322,214**	**187,275**	**134,939**		**$3,599**	**$1,530**	**$2,069**

SOURCE: Vegetable inventory 2005-06, Michigan Rotational Survey

Table 6. Value of Fruit Production in Michigan and Six-County Region, 2007

	Michigan			Six-county region			
	Production (1,000 lbs)			% of harvested acres	Production (1,000 lbs)		
	Total	Fresh	Processed		Total	Fresh	Processed
Blueberries	$111,770	$51,030	$60,740	0.0%	$0	$0	$0
Apples	$108,545	$62,741	$45,804	9.5%	$10,314	$5,962	$4,352
Cherries, tart	$47,808	$0	$47,808	51.7%	$24,739	$0	$24,739
Cherries, sweet	$15,409	$1,517	$13,892	79.9%	$12,304	$1,211	$11,093
Strawberries	$13,852	$5,044	$8,808	3.2%	$437	$159	$278
Peaches	$12,437	$9,777	$2,660	3.0%	$379	$298	$81
Plums	$1,059	$628	$431	34.5%	$365	$217	$149
All fruit	**$310,880**	**$130,737**	**$180,143**		**$48,539**	**$7,847**	**$40,692**

NOTE: Fruit production and values are averages for 2003-2007.
SOURCE: 2007 Michigan Agricultural Statistics

During the 2007 growing season, Michigan farmers produced more than three billion pounds of vegetables and more than one billion pounds of fruits with market values of $322 million and $310 million, respectively. Farmers in the six-county region produced 1.4 percent of the state's vegetables and 18.0 percent of the state's fruit by weight. In terms of value, the region's farmers sold $3.6 million in vegetables (1.1 percent of the state's sales) and $48.5 million in fruit (15.6 percent of the state's fruit sales.)

Figures 2 and 3 compare the proportion (in terms of quantity and value) of vegetables and fruit, respectively, sold to fresh markets in Michigan and in the six–county region. Based on these rough estimates, farmers in the six-county region appear to sell a significantly smaller share of their fruits and vegetables to fresh markets than do farmers in Michigan as a whole. This is partly a function of the types and quantities of fruits and vegetables produced in the region. For example, tart cherries account for 44 percent of the quantity of fruit grown in the region. Because the percentage of this dominant fruit sold into fresh markets is very low (a mere 0.3 percent), it substantially reduces the overall quantity of the region's fruits sold to fresh markets. Similarly, the vegetables produced in the region are generally those for which a greater percentage are processed (e.g., potatoes, snap beans, tomatoes, cucumbers.) The lower proportion of fresh sales in the region relative to the state may also reflect the distance to the state's major metropolitan areas and the consequent smaller local market for fresh fruits and vegetables.

Fresh sales include products sold directly to end-users (i.e., consumers, restaurants, schools, or stores) as well as products sold wholesale through distributors. The distinction is important because direct markets generally command a higher price than do wholesale markets which, in turn, are generally higher-value markets than processing markets. Increasing sales of fresh products, especially through direct sales, represents one path to improved farm profitability and increased economic impact of agriculture in the region.

Figure 2. Fresh Vegetable Marketing

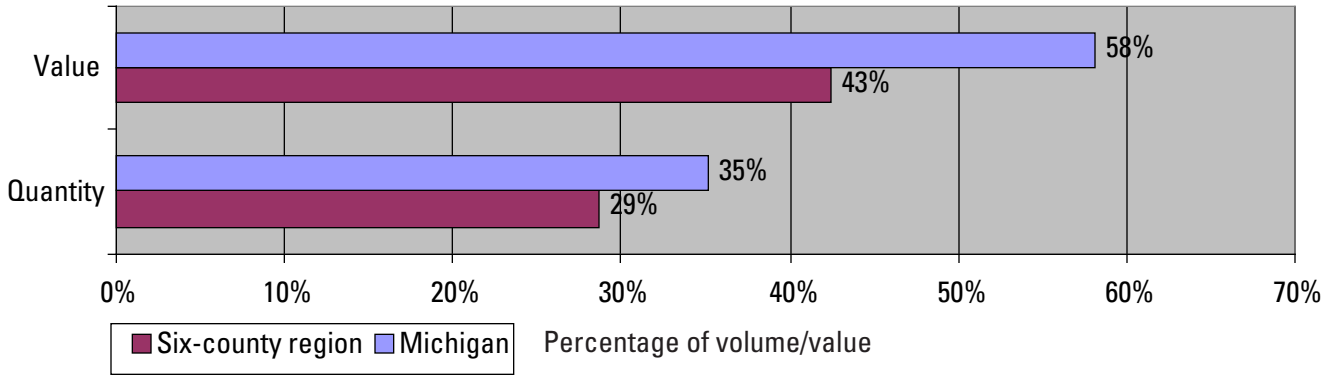
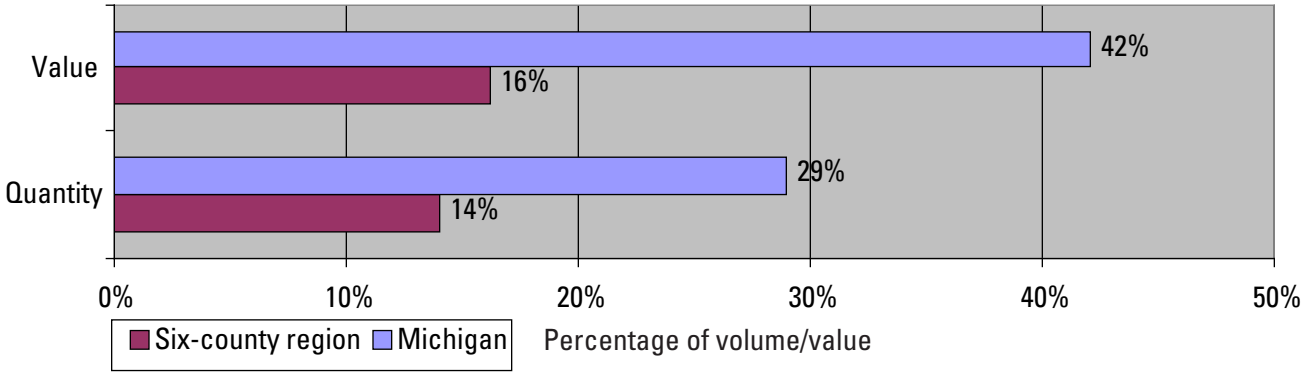


Figure 3. Fresh Fruit Marketing



Data on the allocation of fresh sales between direct and wholesale markets do not exist. This report thus follows the analysis of Cantrell et al. (Cantrell et al. 2006) to estimate the allocation of fresh sales between direct and wholesale markets. It assumes, based on a study from New York,[14] that fruit and vegetables each account for about 30 percent of direct market revenue. The 2002 Census of Agriculture reported that farmers in the six-county region sold about $1.4 million directly to consumers. If the growth in direct sales follows the trend of the past two Census of Agriculture years, then direct sales in 2007 should have been about $1.7 million.[15] Thus the region's farmers may have sold an estimated $0.50 million of fruit and an equal value of vegetables directly to individual consumers in 2007. The remaining $0.668 million went to fresh wholesale markets. The analysis then uses average fresh market prices as reported in the Michigan Agriculture Statistics and an assumption (again from Cantrell, et al. 2006) that direct market prices for fruit and vegetables are five times higher than wholesale prices (1.5 times for potatoes) to estimate the quantities of fresh fruit and vegetables sold to fresh direct and fresh wholesale markets.

Opportunities in Consumption and Production

The previous section developed rough estimates of the quantities of fruits and vegetables local farmers sell to fresh direct and wholesale markets. Comparing these to estimates of local consumption identifies products for which local consumption exceeds local production. These represent opportunities for local farmers to produce or market to an established market.

The USDA's Economic Research Service (ERS) produces annual estimates of per capita consumption of fresh and processed foods.[16] Multiplying these estimates by the population of a region generates estimates of total consumption of foods in a region. Tables 7 and 8 compare estimated consumption of selected fresh fruits and vegetables, respectively, in the six-county region to estimated fresh direct and wholesale sales in the region. Consumption estimates reflect Census Bureau projections of the 2007 population of the region plus an adjustment for tourist days spent in the region.[17] [18]

The final three columns of tables 7 and 8 quantify three types of opportunities for local farmers.

- Opportunity A: The column titled "Opportunities for increasing production" shows the difference (in pounds) between local consumption and local production. Positive numbers indicate that local consumption exceeds local production and thus represent an opportunity for farmers to expand production to satisfy existing demand for fresh and processing markets.
- Opportunity B: The column titled "Opportunities for increasing fresh sales" shows the difference (in pounds) between local fresh consumption and local fresh sales. Positive numbers indicate that local fresh consumption exceeds local fresh sales and thus represent an opportunity for farmers to expand fresh sales (either direct or wholesale) to satisfy existing demand.
- Opportunity C: The column titled "Opportunities for increasing direct sales" shows the difference (in pounds) between local consumption and local direct sales. Positive numbers indicate that local fresh consumption exceeds local direct sales and thus represents an opportunity for farmers to sell more into lucrative direct markets.

Table 7. Opportunities in Fresh Fruit Sales—Production versus Consumption

Product	Regional production	Regional fresh sales			Regional fresh consumption	Opportunities (in lbs) for…		
		Total	Direct	Wholesale		Opportunity A - Increasing production	Opportunity B - Increasing fresh sales	Opportunity C - Increasing direct sales
Grapes	0	0	0	0	117,375	117,375	117,375	117,375
Pears	0	0	0	0	48,779	48,779	48,779	48,779
Raspberries	0	0	0	0	12,195	12,195	12,195	12,195
Blueberries	0	0	0	0	6,860	6,860	6,860	6,860
Apricots	0	0	0	0	1,143	1,143	1,143	1,143
Strawberries	297,158	145,895	12,333	133,561	69,739	-227,419	-76,156	57,406
Peaches	1,109,913	660,010	55,795	604,215	52,590	-1,057,322	-607,420	-3,204
Plums	1,792,911	634,415	53,631	580,784	11,433	-1,781,478	-622,982	-42,198
Cherries	36,123,566	1,344,719	91,805	994,179	16,768	-36,106,798	-1,327,951	-75,037
Apples	76,015,936	26,130,478	2,208,964	23,921,514	3,527,355	-72,488,581	-22,603,123	1,318,391

Table 8. Opportunities in Fresh Vegetable Sales—Production versus Consumption

Product	Regional production	Regional fresh sales			Regional fresh consumption	Opportunities for…		
		Total	Direct	Wholesale		Opportunity A-Increasing production	Opportunity B-Increasing fresh sales	Opportunity C-Increasing direct sales
Onions	51,304	51,304	4,337	46,967	3,929,632	3,878,328	3,878,328	3,925,295
Romaine and leaf lettuce	0	0	0	0	686,417	686,417	686,417	686,417
Carrots	37,209	17,860	1,510	16,350	532,914	495,706	515,054	531,404
Cantaloupe	0	0	0	0	146,338	146,338	146,338	146,338
Mushrooms	0	0	0	0	116,613	116,613	116,613	116,613
Cabbage	0	0	0	0	93,862	93,862	93,862	93,862
Spinach	0	0	0	0	92,376	92,376	92,376	92,376
Broccoli	10,920	10,920	923	9,997	93,748	82,828	82,828	92,825
Bell peppers	0	0	0	0	80,257	80,257	80,257	80,257
Celery	0	0	0	0	46,340	46,340	46,340	46,340
Cauliflower	0	0	0	0	26,066	26,066	26,066	26,066
Radishes	0	0	0	0	16,158	16,158	16,158	16,158
Collard greens	0	0	0	0	12,119	12,119	12,119	12,119
Mustard greens	0	0	0	0	8,689	8,689	8,689	8,689
Turnip greens	0	0	0	0	8,460	8,460	8,460	8,460
Kale	0	0	0	0	7,546	7,546	7,546	7,546
Brussels sprouts	0	0	0	0	4,268	4,268	4,268	4,268
Asparagus	14,359	3,590	303	3,286	17,225	2,866	13,635	16,922
Cucumbers	378,356	86,292	7,295	78,997	96,796	-281,560	10,505	89,502
Tomatoes	981,344	149,131	12,607	136,524	303,956	-677,388	154,825	291,349
Pumpkin	1,433,963	1,433,963	121,221	1,312,741	73,169	-1,360,794	-1,360,794	-48,052

Of course fresh markets (direct and wholesale) for locally produced fruits and vegetables exist outside the six-county region and some local farmers are selling to these markets. Negative numbers suggest that, in order to expand fresh sales of these products, farmers will need to look beyond the region. For example, local production of apples exceeds local consumption by almost 27 million pounds. Similar surpluses exist for strawberries, asparagus, snap beans, cucumbers, tomatoes, and potatoes. For cucumbers and tomatoes, however, even though local production exceeds local consumption, the positive numbers under opportunity B suggest that farmers could sell more to fresh markets. Furthermore, for these two products, and for snap beans, potatoes, strawberries, and apples, where a large portion of fresh sales are to wholesale markets, the large positive numbers under opportunity C suggest that farmers could significantly expand direct sales. These cases, particularly strawberries, apples, and potatoes, appear to represent large opportunities in that the region's farmers produce

enough to easily satisfy local demand but still seem to cede some of the fresh and/or direct market to outside suppliers. These products represent particularly lucrative opportunities to redirect existing low-value production into high-value markets.

Not surprisingly, some of the larger opportunities are in fruits and vegetables that are not grown in large quantities in the region. These include grapes, pears, raspberries, blueberries, apricots, onions, greens, and several other vegetables.[19] These products offer opportunities for increased production (opportunity A), increased fresh sales (opportunity B), and increased direct sales (opportunity C). It could be that the region is not well suited to growing some of these products.

The preceding analysis suggests that opportunities exist for local farmers to increase their sales of fresh agricultural products or to sell more products into higher value fresh and direct markets. Because the data are incomplete and in some cases imprecise, the existence and magnitude of the opportunities are far from certain. It will require additional market research to validate and precisely quantify the opportunities. Nevertheless, there are almost certainly substantial opportunities to increase revenue in several key agricultural products grown in the six-county region.

Scenarios for Increased Agricultural Revenue

What do these opportunities potentially mean for the region's agricultural industry? If the region's farmers increased their fresh sales of the fruits and vegetables listed in tables 7 and 8 to both direct and wholesale markets by 50 percent, they would increase revenues by $2.9 million annually. There are many possible scenarios for increased fresh sales. Table 9 illustrates nine of those scenarios based on combinations of 0, 50, 100, and 200 percent increases in fresh sales to direct and to wholesale markets. The impact of these scenarios on farm revenues in the region ranges from $1.3 million (with a 50 percent increase in direct sales and no increase in wholesale sales) to $11.6 million annually (with a 200 percent increase in both direct and wholesale sales).

These numbers suggest that it may be possible to increase total revenue from the sale of agricultural products in the region by 1.3 percent to 11.9 percent relative to current levels by increasing the penetration of local products into existing high value direct and fresh markets. Somewhat counter intuitively, a given percentage increase in wholesale sales generates a larger increase in revenue than the same increase in direct sales. This is because the volume of wholesale markets is larger than the volume of direct markets.

Table 9. Revenue Impact of Increasing Fresh Sales of Fruits and Vegetables, ($1,000)

		Increase in wholesale sales			
		0%	50%	100%	200%
Increase in direct sales	0%	$0	$1,637,568	$3,275,138	$6,550,275
	50%	$1,272,404	$2,909,973	$4,547,542	$7,822,680
	100%	$2,544,809	$4,182,377	$5,819,946	$9,095,084
	200%	$5,089,618	$6,727,186	$8,364,755	$11,639,893

IV. Agriculture in the Six-County Region

Previous sections of this report concluded that agriculture is a substantial economic force in the six-county region, contributing at least $97.7 million to the local economy in 2007. In spite of its economic importance, however, the future of the region's agriculture is not assured. Rapid population growth with the consequent changes in land use, increasing input costs, and a shrinking base of agricultural support industries all put pressure on farms. The region's unique resources – agricultural and otherwise – may provide it the tools to counter these threats and to flourish as the region grows, in part by exploiting the opportunities identified in the previous section. This section reviews various factors that may influence the region's ability to exploit opportunities in agriculture and thus maintain, or even expand, this important component of the economy.

While agriculture is not the most important industry in the region in terms of annual sales, it is relatively more important to the region than it is to the economy of the state overall. Agriculture accounts for 2.4 percent of all sales in the region compared to 0.6 percent statewide – four times greater in terms of relative importance. The region is much less dependent on manufacturing and retail trade than is the state as a whole and much more dependent on agriculture, health care and social assistance, administrative services, other services, and arts, entertainment, and recreation. Figure 4 illustrates the relative importance of different economic sectors to the region and to the state.[20]

Characteristics of Agriculture in the Six-County Region

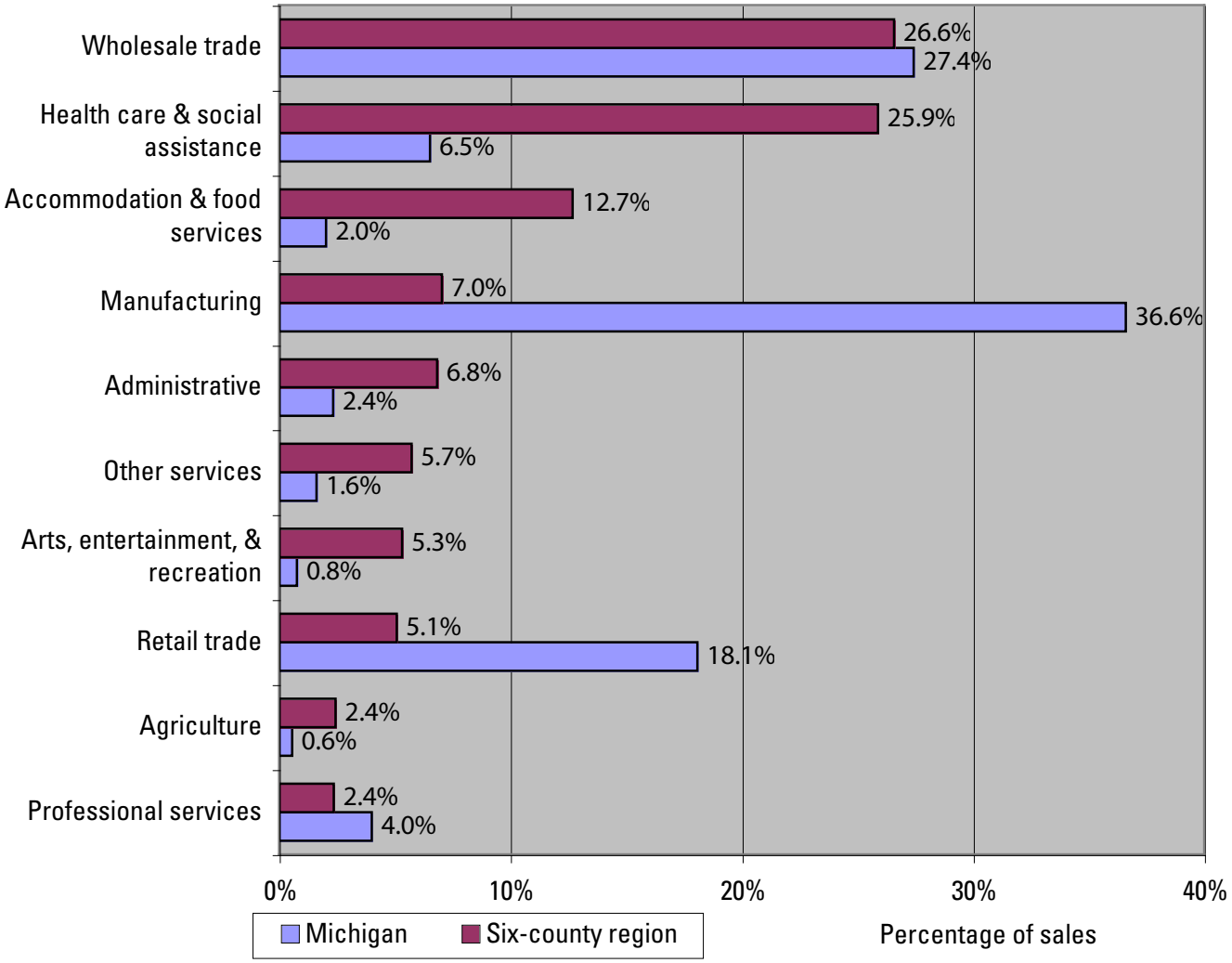
Most of Michigan's agricultural land lies in the southern part of the state. The 35 counties of the southern Lower Peninsula comprise 56 percent of the Lower Peninsula's land area but contain a disproportionate 77 percent of the land in farms and 80 percent of the active farmland. By contrast, the 33 counties in the northern Lower Peninsula contain only 23 percent of the land in farms in the Lower Peninsula and 20 percent of its active farmland. Overall, 42 percent of the land area in the southern Lower Peninsula is actively farmed compared to 14 percent in the northern Lower Peninsula.

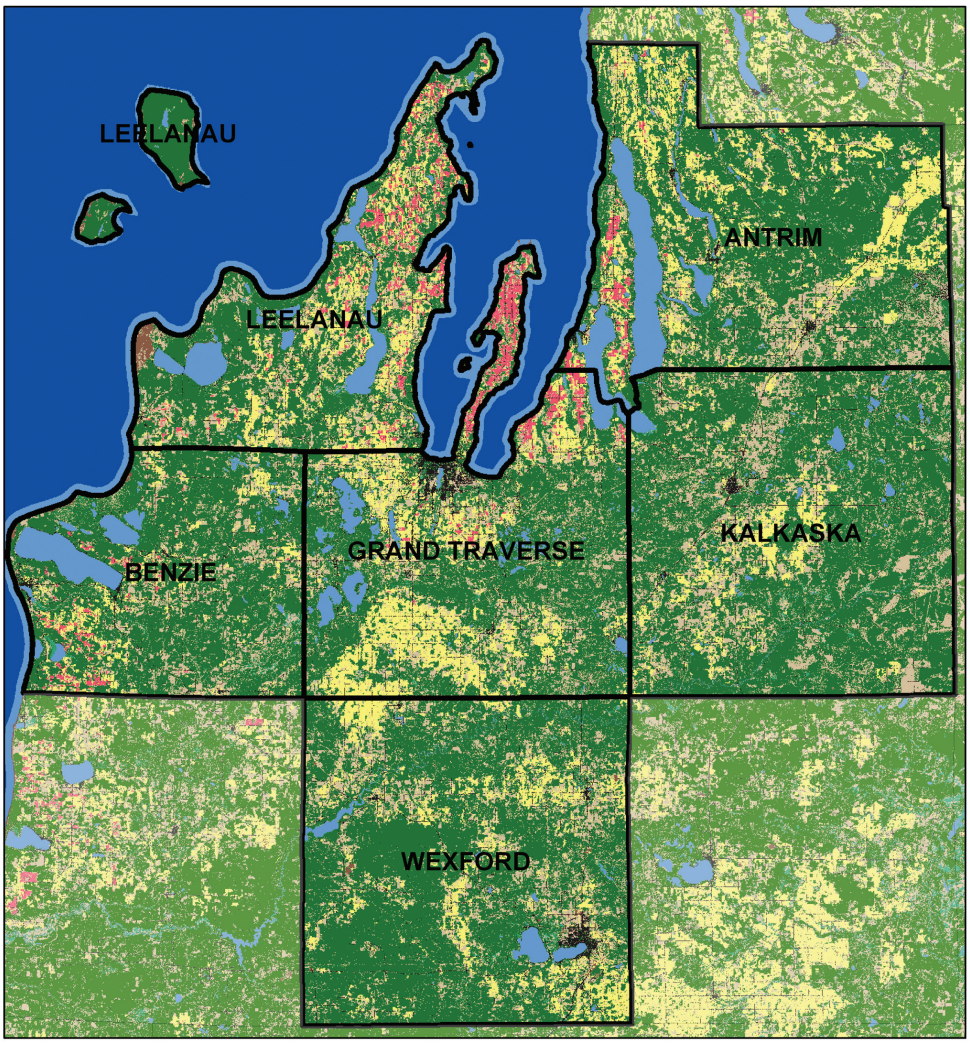
The agricultural landscape of the six-county region typifies that of the northern Lower Peninsula. Forests dominate the region, 19 percent of the land is in farms, and just less than 10 percent of the land is actively farmed. The map, Figure 5, illustrates the distribution of agricultural land in Michigan and the six-county region.

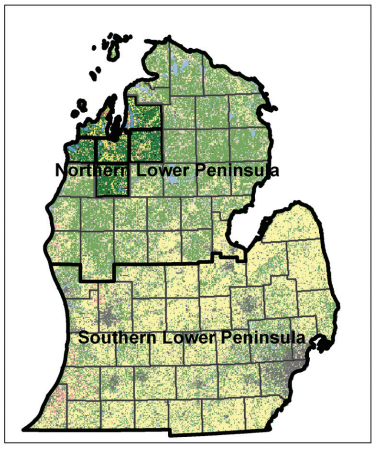
The climate and terrain of much of the six-county region is ideally suited to fruit production. Consequently, the region contains 80 percent of the state's sweet cherry acreage, 52 percent of its tart cherries, and 34 percent of its plums and prunes. Table 10 illustrates the importance of the region to Michigan's fruit industry.

In terms of farm revenue, the region's agriculture is more dependent on fruit and less dependent on grains (wheat, corn, and soybeans) than are farms in Michigan overall. Figure 6 illustrates the relative importance of various agricultural products to the region's farms compared to all farms in Michigan.[21] Compared to all farms in Michigan, the region's farms earn a greater proportion of their revenue from fruits and nuts and a lower proportion from grains and livestock. Fruit and nuts accounted for almost half of all farm revenue in the region over the past four Census of Agriculture reporting years.

Figure 4. Relative Magnitude of Sales by Sector, 2002







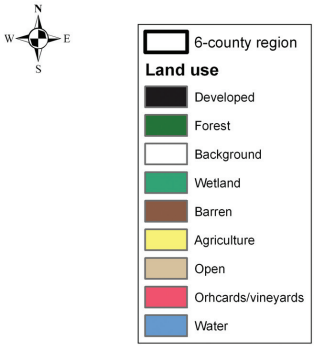


Figure 5. Land use in Michigan and in the Six-County Region

Table 10. Region Share of Michigan's Fruit and Nut Acreage

	Michigan Acres	Six-county region	
Product		Acres	% of MI acres
Cherries, sweet	9,981	7,970	79.9%
Cherries, tart	33,685	17,431	51.7%
Plums and prunes	931	321	34.5%
Other fruit and nuts	595	142	23.9%
Pears	1,075	132	12.3%
Apples	50,200	4,770	9.5%
Grapes	13,261	668	5.0%
Peaches	6,174	188	3.0%
Apricots	55	0	0.0%
Hazelnuts	45	0	0.0%
Nectarines	62	0	0.0%
Walnuts, english	30	0	0.0%

SOURCE: 2002 Census of Agriculture

Figure 6. Distribution of Revenue by Product

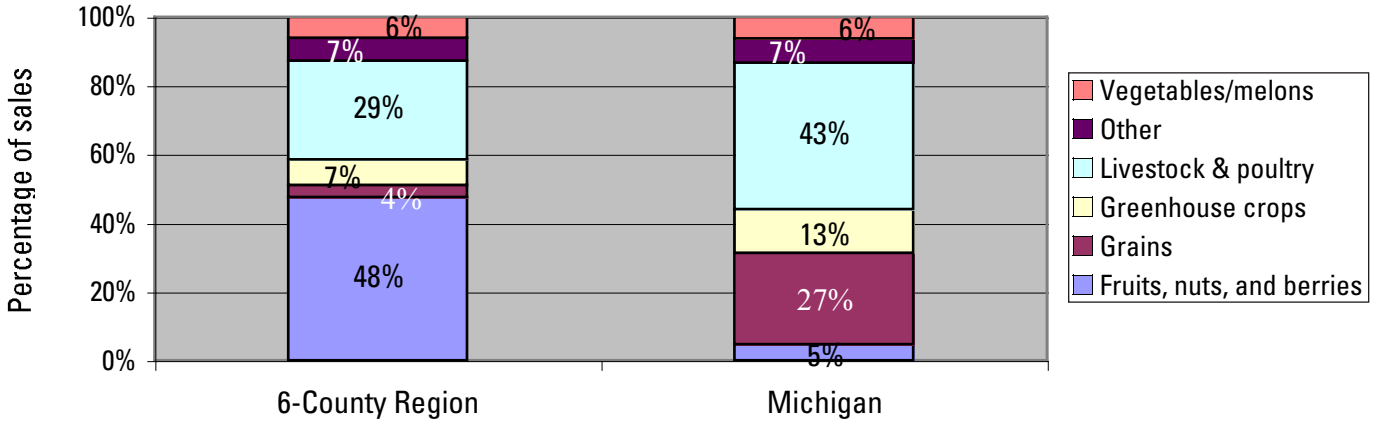


Table 11 summarizes other differences between farms in the region and the average farm in Michigan.

Table 11. Selected Characteristics of Farms, 2002

Characteristics	Six-county region	Michigan
Average farm size (acres)	137	190
Proportion utilized for farming (%)	51	79
Farms with direct sales (%)	12.5	9.2
Average value of direct sales ($)	$5,480	$7,567
Farmers for whom farming is primary occupation (%)	52	54
Farms that produced and sold value-added commodities #/%, 2007	135/6.2	2,194/3.9

On average, the region's farms are smaller than the statewide average with a lower proportion of the land used for crops. A greater percentage of farmers in the region sell at least some of their products directly to individuals but, on average, sell less per year than their direct marketing counterparts statewide. Farmers in the region are just as likely as farmers throughout the state to depend primarily on farming for their livelihoods. Based on the just-released 2007 Census of Agriculture, the region's farmers are more likely than farms statewide to produce and sell value-added commodities. They are also more than three times as likely to have "marketed products through a community supported agriculture (CSA) arrangement."

Trends in Agriculture in the Region

By some measures, agriculture in the region appears to be expanding. The 2002 Census of Agriculture documented 2,051 farms in the six-county region, a 20 percent increase from the 1,674 farms counted in 1992. The increase in farm numbers belies a one percent decline in farm numbers statewide over the same period. Corresponding to the increase in farm numbers, the region also gained farmland between 1992 and 2002, again bucking a 2.7 percent decline in farmland statewide. Land in farms in the region increased from 258,911 acres to 281,118 acres.[22] During that period, only Grand Traverse and Leelanau counties lost farmland. The Census of Agriculture significantly improved coverage of small farms in 2002 and the increase in the number of farms and land in farms may be an artifact of this improved coverage rather than an actual increase (Council on Food, Agricultural and Resource Economics 2007).

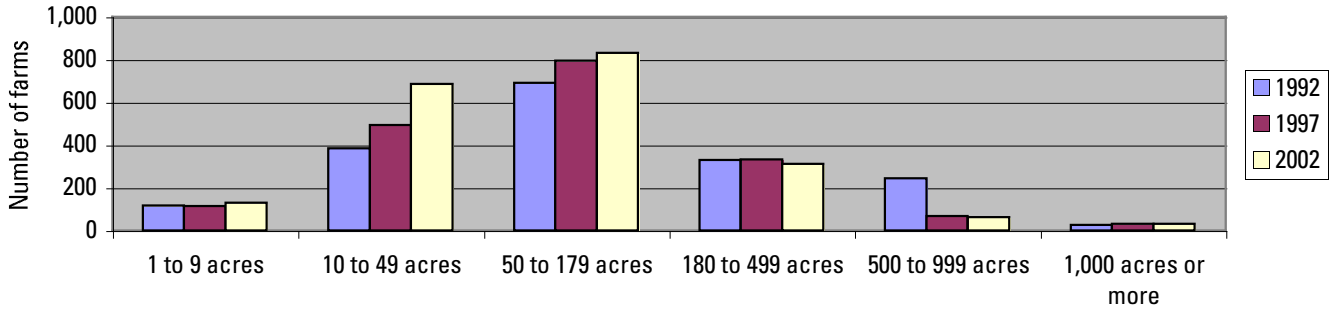
While land in farms has increased since 1992, the land actively used for farming (i.e., cropland) has declined precipitously. Between 1992 and 2002 cropland acres in the six-county region fell from 164,845 to 114,067 acres. A detailed analysis of land use change is required to understand how agricultural land use is changing. In the six-county region, such an analysis is available only for Leelanau County. Detailed analysis of acre-by-acre changes in land cover in Leelanau County between 1990 and 2000 suggests that 86 percent of the land that transitioned out of agricultural use between 1990 and 2000 (9,725 acres) reverted to nonforested land. However, that non-forested land includes 1,500 acres of newly subdivided housing lots of 20 acres or less, many of which now contain homes. An additional 875 acres classified as agricultural in 1990 became higher density residential developments by 2000.

Residential development likely poses a significant risk to farmland in the six-county region. Five of the counties in the region are among the 16 highest growth counties between 1990 and 2000. Residential development has a greater impact than just removing land from agricultural use. It also makes farming the remaining land more difficult as it fragments farmland and increases the potential for conflict over farming practices, dust, noise, and farm traffic on rural roads. A survey of farmers in Leelanau County conducted by the Leelanau Ag Alliance in 2003 found conflict with non-farm neighbors to be a significant barrier to farming for many farmers.

At least in Leelanau County, farmland seems to be absorbing a disproportionate share of new rural development. While farmland accounted for only 24 percent of the land area in Leelanau County in 1990, it absorbed 34 percent of the new residential development. At the same time, forested land, which accounted for 43 percent of the 1990 land cover, absorbed only 37 percent of the new urban development.

The structure of farms in Michigan and in the six-county region has also changed over time. In particular, between 1992 and 2002 the number of farms smaller than 180 acres has increased while the number of large farms (180 acres and larger) has fallen. Figure 7 illustrates changes in the distribution of farms by size between 1992 and 2002. The apparent increase in the number of smaller farms may be an artifact of increasingly better census coverage of smaller farms (Council on Food, Agricultural and Resource Economics 2007).

Figure 7. Distribution of Farms by Size



Profile of the Region's Food System

Farmers in the six-county region do not act in isolation to provide fresh local foods to the region's residents. The regional food system encompasses producers, food processors, distributors/ wholesalers, retail outlets, restaurants, and consumers. Each of these plays a role in providing food to the region's residents and visitors. Table 12 provides a partial picture of the region's food system drawn from diverse data sources.

V. Conclusions

Agriculture contributes substantially to the economy of the six-county region. Furthermore, ample opportunities exist to significantly expand its economic footprint. Efforts to increase the penetration of local agricultural products into relatively high-value fresh markets have the potential to dramatically improve farm profitability for both large farmers and the smaller farmers who comprise a rapidly growing segment of the region's agricultural industry. The region's dominance within the state and region in the production of some fruits and a growing vegetable industry position it well to expand sales of fresh products.

Farmers will need to look outside the region in search of new markets. The region's farmers grow so much of some products that local markets are wholly inadequate to absorb even a small portion of the quantity produced. Apples and cherries are good examples. The region has a comparative advantage over much of the rest of the state in many fruit products, however, which means it can compete in fresh markets outside the region. Opportunities also appear to exist to expand local markets by displacing products brought in from outside the region. Apples and strawberries may be examples of these opportunities.

Obviously there are many obstacles to exploiting these opportunities. These range from competition with residential development for the land base essential to agriculture to the lack of processing, storage, or distribution capacity suited to local and regional marketing. The Michigan Land Use Institute, and others, are working to address these constraints.

Much is at stake. If agriculture fails to survive, it will take with it a heritage that defines the region and the $97.7 million direct economic impact it has on the region's economy. The loss of scenic beauty associated with agricultural landscapes will dramatically reduce the quality of life enjoyed by the region's residents. It will also likely affect the tourist activity that is so important to the region's economy.

Table 12. Food System Components in the Six-County Region

Food System Component	Enterprises	Employment	Payroll ($1,000)	Sales ($1,000)
Production				
All producers	2,179a	Labor: 3,831a Operators: 3,244a	Wages: $17,877a Income: $13,545a	$98,794a
CSAs	58a			
Manufacturing/processing				
Food manufacturing/processing	25	951	$6,500	
Distribution/wholesalers				
Food distribution/wholesalers	21	798	$37,246	
Retail sales				
Farm markets	21b			
Farmer's markets	14b			
Direct marketing	393a	n.a.	n.a.	$2,414a
Grocery stores	82	1,321	$26,312	
Food services and drinking places	375	5,801	$75,441	$22,997
Full service restaurants	189	3,750	$52,351	
Consumers				
Regional population (2007)[c]		198,166 residents		
Tourists (2007)		5.1e million visitor days		n.a.
Schools (2008)	96d	30,435 d (enrollment)		n.a.
Hospitals	6			n.a.

Note: All data from the U.S. Census Bureau's County Business Patterns (2006) except where otherwise noted.

a. From the just-released 2007 Census of Agriculture.

b. Taste the Local Difference.

c. U.S. Bureau of the Census, population estimates, Online:

d. http://www.greatschools.net/schools/districts/Michigan/MI/2

e. Analysis of data from Michigan Travel Market Survey, 1996-2003, Michigan State University.

Appendix

Table A1. Direct Impacts of Field Crops

	Michigan	Six-county region	
	Direct impact	% of MI production	Direct impact
Crop	($1,000)		($1,000)
Barley	$1,329	1.9%	$25
Corn for grain	$871,127	0.6%	$5,115
Dry beans	$81,329	0.0%	$0
Hay	$323,844	2.3%	$7,525
Oats	$8,132	3.6%	$293
Potatoes	$117,758	3.8%	$4,470
Soybeans	$551,227	0.0%	$54
Sugarbeets	$114,854	0.0%	$0
Wheat	$156,999	0.3%	$502
Total	**$2,247,328**		**$17,984**

Michigan direct impact is average of 2005 - 2007 sales. Source: Michigan Agriculture Statistics

Percent of Michigan production in six-county region is aveage of 1992, 1997, and 2002 Census of Agriculture data. Source: USDA Census of Agriculture.

Table A2. Direct Impacts of Fruit

	Michigan	Six-county region	
	Direct impact	% of MI production	Direct impact
Crop	($1,000)		($1,000)
Apples	$115,771	8.9%	$10,286
Blueberries	$132,870	0.0%	$20
Tart cherries	$44,386	47.4%	$21,043
Peaches	$12,449	2.5%	$310
Sweet cherries	$16,644	79.2%	$13,185
Grapes	$19,608	3.6%	$712
Pears	$1,192	9.8%	$116
Plums	$1,105	28.0%	$310
Strawberries	$5,277	5.6%	$295
Other	$2,035	0.0%	$0
Total	**$351,337**		**$46,277**

Michigan direct impact is average of 2005 - 2007 sales. Source: Michigan Agriculture Statistics

Percent of Michigan production in six-county region is average of 1992, 1997, and 2002 Census of Agriculture data. Source: USDA Census of Agriculture.

Table A3. Direct Impact of Vegetables

	Michigan	Six-county region	
	Direct impact	% of MI production	Direct impact
Crop	($1,000)		($1,000)
Processing carrots	$2,856	na	na
Processing cucumbers	$32,021	na	na
Processing snap beans	$11,070	na	na
Processing tomatoes	$9,855	na	na
Snap beans	$10,280	6.8%	$695
Cabbage	$6,922	0.0%	$0
Carrots	$14,264	0.0%	$1
Sweet corn	$15,583	2.2%	$346
Cucumbers	$15,563	0.0%	$5
Onions	$7,072	0.0%	$2
Tomatoes	$21,129	0.2%	$34
Asparagus	$14,096	0.7%	$102
Celery	$14,228	0.0%	$0
Bell peppers	$9,479	0.0%	$0
Pumpkins	$8,451	1.4%	$118
Squash	$15,137	0.4%	$64
Total	**$208,007**		**$1,366**

Michigan direct impact is average of 2005 - 2007 sales. Source: Michigan Agriculture Statistics

Percent of Michigan production in six-county region is average of 1992, 1997, and 2002 Census of Agriculture data. Source: USDA Census of Agriculture.

"na" for processed vegetables means that they are included with fresh vegetables.

Table A4. Direct Impact of Livestock

	Michigan	Six-county region	
	Direct impact	% of MI production	Direct impact
Crop	($1,000)		($1,000)
Cattle	$305,246	1.3%	$6,929
Dairy	$1,160,867	2.3%	$10,878
Hogs	$223,294	0.0%	$651
Honey	$4,710	0.3%	$624
Sheep and lambs	$3,397	0.0%	$42
Turkeys	$77,853	0.0%	$243
Other	$41,644	0.3%	$4,526
Total	**$1,917,216**		**$23,892**

Michigan direct impact is average of 2005 - 2007 sales. Source: Michigan Agriculture Statistics

Percent of Michigan production in six-county region is average of 1992, 1997, and 2002 Census of Agriculture data. Source: USDA Census of Agriculture.

Endnotes

[1] The region addressed in this report includes Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau, and Wexford counties.

[2] U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts. Accessed, 12-22-08, http://www.bea.gov/regional/gsp/.

[3] The USDA released data from the 2007 Census of Agriculture just as this report was going to press. The report incorporates several key data elements from the 2007 Census but most of the analysis draws from earlier Censuses.

[4] US Department of Agriculture (USDA), National Agriculture Statistics Service (NASS), Michigan Field Office. Online: http://www.nass.usda.gov/Statistics_by_State/Michigan/Publications/Annual_Statistical_Bulletin/index.asp

[5] US Department of Agriculture, Census of Agriculture (2002, 1997, 1992), Michigan State and County Data. Online, http://www.agcensus.usda.gov/Publications/2002/Volume_1,_Chapter_2_County_Level/Michigan/index.asp

[6] Because of substantial annual variability in agricultural production and sales, averages more accurately represent typical production levels.

[7] US Department of Agriculture, Census of Agriculture (2002), Michigan State and County Data. Online, http://www.agcensus.usda.gov/Publications/2002/Volume_1,_Chapter_2_County_Level/Michigan/index.asp

[8] Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, Online: http://www.bea.gov/regional/reis/CA30fn.cfm

[9] This includes surveys conducted by the Leelanau Agriculture Alliance (2001), Leelanau County Department of Planning and Community Development (2003), Petoskey Area Open Space Task Force (2003), and the Grand Vision Land Use and Transportation Study (2007 to present).

[10] Data from the Michigan Travel Market Survey conducted by Michigan State University suggests that 73 percent of tourists to the six-county region spend part of their time in the region engaged in general touring or driving to enjoy the scenery. This was the single most common activity among those who visited the region.

[11] The USDA released data from the 2007 Census of Agriculture as this report was going to press.

[12] US Department of Agriculture (USDA), National Agriculture Statistics Service (NASS), Michigan Field Office. Online: http://www.nass.usda.gov/Statistics_by_State/Michigan/Publications/Annual_Statistical_Bulletin/index.asp

[13] US Department of Agriculture, Census of Agriculture (2002, 1997, 1992), Michigan State and County Data. Online, http://www.agcensus.usda.gov/Publications/2002/Volume_1,_Chapter_2_County_Level/Michigan/index.asp

[14] New York Berry News (2003). The New York Berry News, Cornell University, Vol. 2, Number 1, January 22, 2003, page 2. http://www.nysaes.cornell.edu/pp/extension/tfabp/newslett/nybn21.pdf

[15] The 2002 Census of Agriculture reported $1.18 million in direct market sales in the six-county region in 1997 and $1.403 million in 2002 – an annual growth rate of 3.5%. If that growth rate continued through 2007, direct market sales would have been about $1.668 million.

[16] US Department of Agriculture, Economic Research Service, Food Availability (per capita) Data System. Online: http://www.ers.usda.gov/Data/FoodConsumption/

[17] U.S. Census Bureau, Monthly Population Estimates for the United States, Online: http://www.census.gov/popest/national

[18] Population estimates for the region include the estimated 1.4 million visitors annually who spend about 5.1 million days in the region – equivalent to an additional year-round population of about 14,000 people. Analysis of Michigan Travel Market Survey conducted by Michigan State University's Travel, Tourism, and Recreation Resource Center (TTRRC) produced the visitation estimates.

[19] No documented production of some fruits and vegetables does not necessarily mean that the yare not produced in the region. It may only mean that production is so small or concentrated that agricultural statistics sources do not report the data.

[20] U.S. Bureau of the Census, 2002 Economic Census. Online: http://www.census.gov/econ/census02/guide/02EC_MI.HTM

[21] Fruit production is so variable that the market value of sales in a given year is not representative. Figure 6 thus presents average shares over four Agricultural Census years; 1987, 1992, 1997, and 2002.

[22] 1992 estimates adjusted for coverage using statewide adjustment factors because adjustment factors are not available at the county level. Use of the statewide factors may result in inaccurate county-level estimates.

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2. Council on Food, Agricultural and Resource Economics. 2007. "A review of the Census of Agriculture." Washington, DC, http://www.cfare.org/publications/20070307cfare_census_review_Full_Report.pdf.
3. Peterson, Christopher H., William A. Knudson, and Getachew Abate. 2008. *Interim update on the economic impact of Michigan's agri-food and agri-energy system*, Michigan State University

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