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Ohio's Agricultural Economy

Agriculture was Ohio's first industry, and remains critical to the state's economy. As discussed below, the broader agrifood economy accounts for more than 10 percent of Ohio's gross domestic product and 14 percent of the state's jobs. With the annual harvest in Ohio nearing its end, this article discusses this broader agrifood economy, and then focuses on the economics, employment, land use, and land values of farming in Ohio.

Ohio's Agrifood Cluster

The impact of agriculture on Ohio's economy extends beyond the farm and forest. It includes manufacturers that process the food, distributors that send it to commercial and retail markets, farm cooperatives, and other service providers such as equipment manufacturing, sales, and leasing; accounting, tax, and legal services; and suppliers of seeds, fertilizer, pesticides and other agricultural inputs. This impact is quantified by the OHFOOD input-output model developed by Thomas L. Sporleder, a researcher in Ohio State University's Department of Agricultural, Environmental, and Development Economics. The most recent results from this model (for 2010) are shown in Exhibit 1 on the next page. As this table shows, the agrifood cluster generates 11.7 percent of Ohio's economic output, 10.7 percent of gross domestic product (GDP), and 14 percent of jobs statewide.

It is important to note that the totals shown in Exhibit 1 include both direct and indirect output, GDP, and employment. Indirect employment represents the dollars and jobs sustained in other industries as a result of the activity of the direct industry. The direct activities cause this additional activity, and it would never have occurred had the direct activities not generated output and employment in the first place. For this reason, the indirect impacts are as much a part of the total economic impact as are the direct impacts. This is the point that makes economic impact analysis of this sort legitimate.

The remainder of this article will focus on the agriculture segment of the overall cluster. As Exhibit 1 makes clear, food production is critically important to the state's economy, but was discussed as part of the manufacturing sector analyzed in the December 7, 2012, edition of *On the Money* (Vol. 129, No. 50).

Exhibit 1
Output, Contribution to Gross Domestic Product, and Employment of Ohio's Agrifood Cluster, 2010

	Output ($millions)	Gross Domestic Product ($millions)	Employment (person-years)
Farm inputs, equipment and professional services	**7,916.3**	**2,003.2**	**32,419**
Farming			
Dairy cattle and milk production	981.6	359.4	5,813
Beef cattle production	426.2	70.9	2,817
Poultry and egg production	755.9	140.7	1,195
Hogs and other farm animals*	664.3	326.2	13,930
Grain production	2,267.2	490.7	36,305
Soybeans and other oil crops	2,335.5	995.2	23,969
Misc. crops, hay, sugar, tobacco, and nuts	366.3	115.0	1,579
Fruits and vegetables	284.7	149.9	1,308
Greenhouse, nursery, and floriculture production	363.9	238.8	2,411
Forestry, hunting, and fishing	363.8	155.0	3,816
Total Farming	**8,809.5**	**3,041.7**	**93,196**
Processing			
Food processing			
Processed meat, fish, poultry, and eggs	3,760.3	1,194.4	9,235
Dairy processing	6,193.8	62.4	7,388
Processed food and kindred products	15,543.6	15,270.0	33,969
Grain milling and flour	1,226.9	4,136.8	714
Fats and oils processing	1,300.1	146.6	323
Beverage processing	7,062.3	507.7	7,404
Total Food processing	35,087.0	21,317.8	59,035
Wood, paper, and furniture manufacturing	14,286.2	660.9	51,412
Total processing	**49,373.3**	**21,978.7**	**110,447**
Food and forestry wholesale/retail	**18,085.6**	**13,131.6**	**245,146**
Food services**	**21,021.6**	**10,824.4**	**419,132**
TOTAL AGRIFOOD SUPPLY CHAIN	**105,206.2**	**50,979.7**	**900,339**
Total Ohio economy	898,791.4	477,699.0	6,445,732
Agrifood percent of total	**11.7%**	**10.7%**	**14.0%**

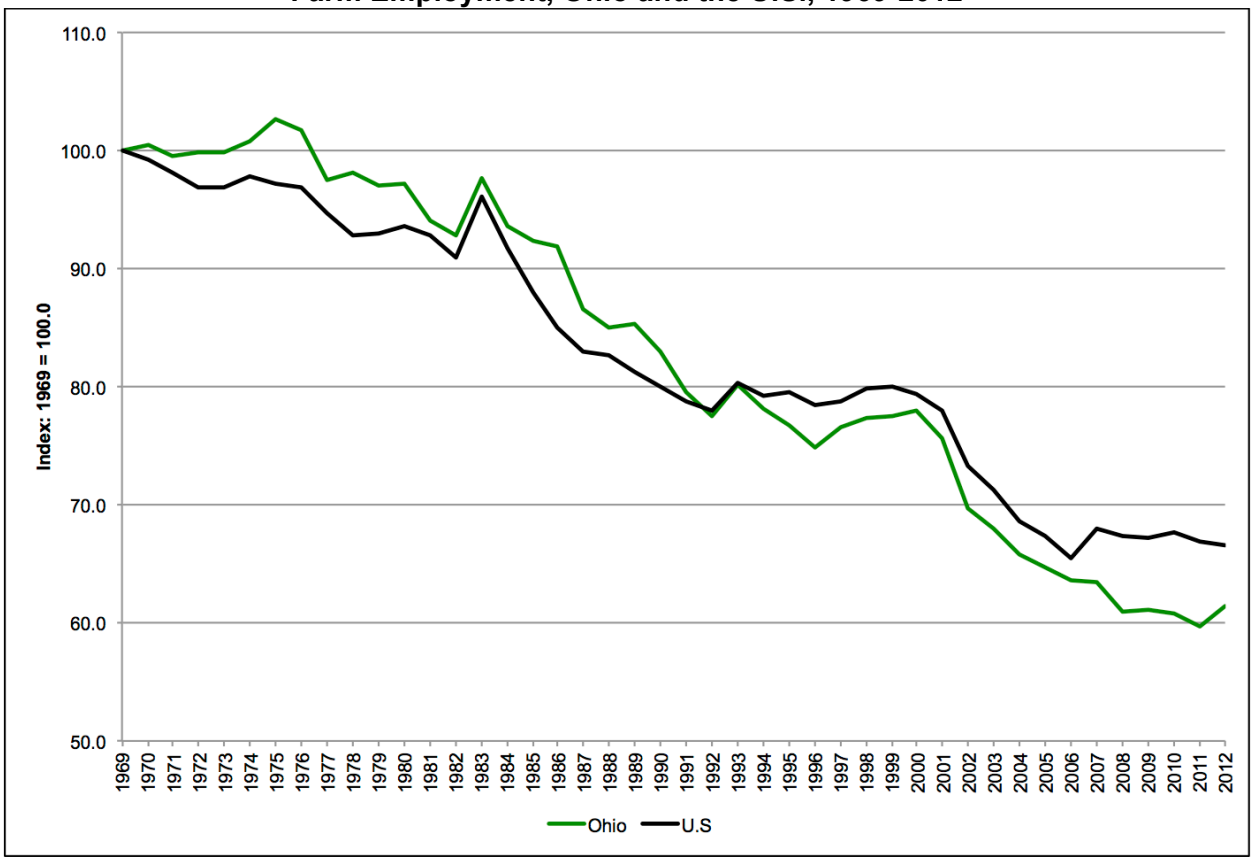
*Sheep, goats, horses, and miscellaneous livestock. **Excludes hotel/motel food service.
Source: Thomas L. Sporleder, "OHFOOD: An Ohio Food Industries Input-Output Model (Year 2010, Version 13.0, June 2012)."

Employment, Production, and Productivity of Ohio Agriculture

Farm employment has been in decline for decades. But as has been the case more recently in manufacturing, this decline is a result of increasing technology-driven productivity. New hybrid crops, GPS-driven combines with laser-controlled planting and spraying equipment, and other scientific advances have significantly increased the productivity both of farm workers and farmland. Exhibit 2 shows the state and national trend of farm employment since 1969. Ohio employment has fallen 38.6 percent – a greater decline than the 33.4 percent national average.

Farming is often not the primary occupation of those who own and/or operate farms. As of 2007, only 41 percent of farm operators in Ohio and 45 percent of operators nationwide considered farming their primary occupation, according to statistics in the Census of Agriculture.

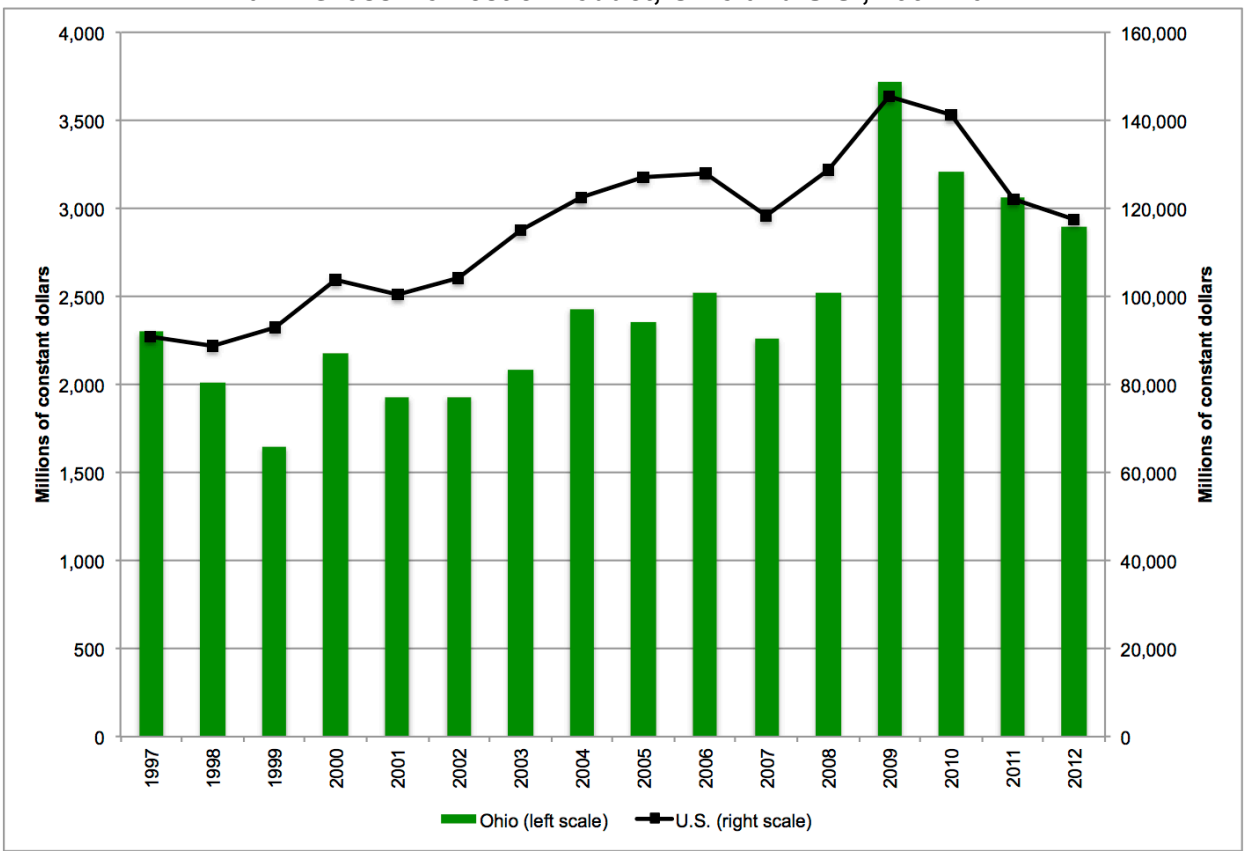
Exhibit 2
Farm Employment, Ohio and the U.S., 1969-2012



Source: Regional Economic Accounts, U.S. Bureau of Economic Analysis.

The value of farm GDP is somewhat variable from year to year, thanks to the variability of both weather and farm prices. But, as Exhibit 3 reveals, the trend has been generally upward both nationally and in Ohio. Constant-dollar production is up 29.2 percent nationally and 26 percent in Ohio. Nationwide GDP has followed the same general trend as Ohio GDP, but with less variability. Unfavorable weather conditions in Ohio often impact large areas of the state and have a larger impact on total output than they would nationally, where unfavorable conditions in one region can be offset by favorable conditions elsewhere. Finally, it is worth noting that the 15-year peak of farm GDP occurred in the recession year of 2009, its trough occurred in the expansion year of 1999, and farm GDP has declined in recent years as total GDP has increased.

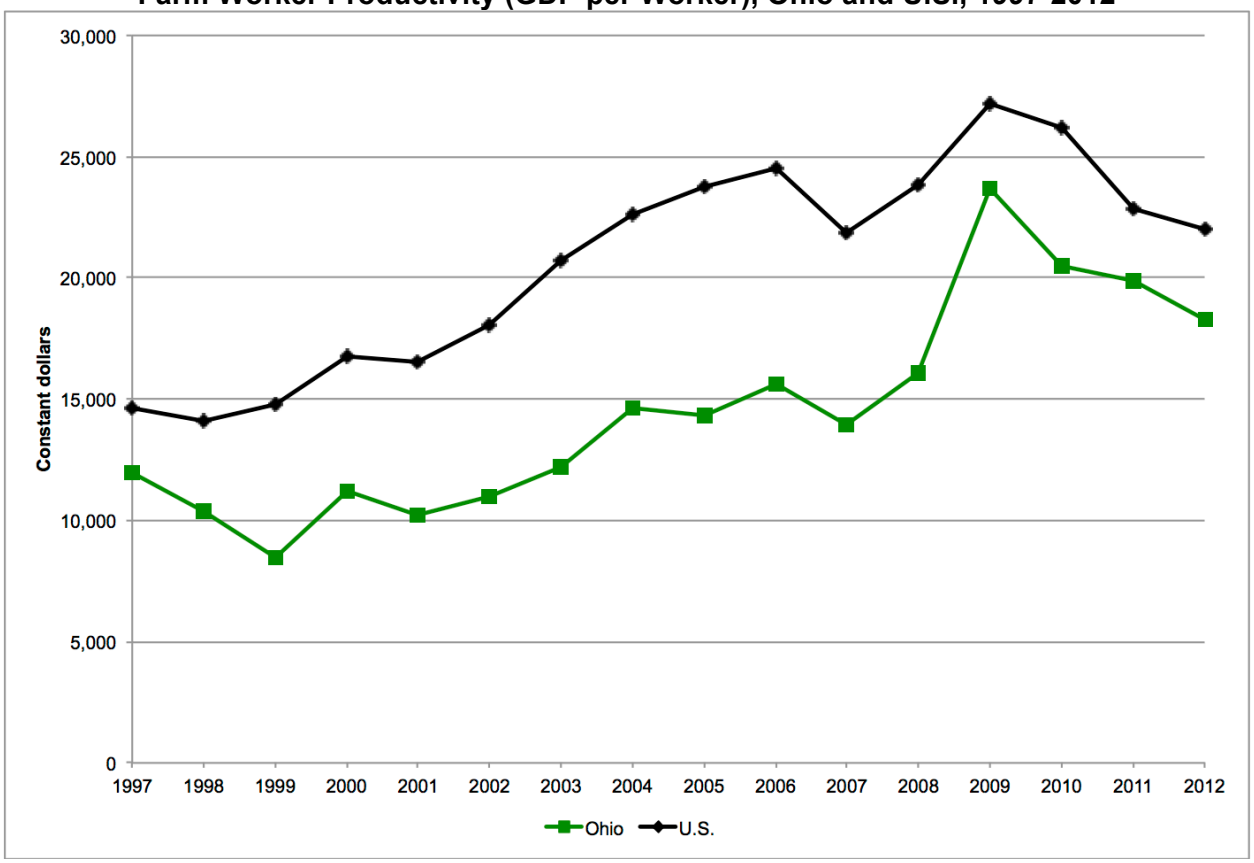
Exhibit 3
Farm Gross Domestic Product, Ohio and U.S., 1997-2012



Source: Regional Economic Accounts, U.S. Bureau of Economic Analysis.

Exhibit 4 tracks the productivity of Ohio and U.S. farm workers over the past 15 years, measured by dividing GDP by employment to obtain GDP per worker. National productivity is consistently higher than that in Ohio. This is likely a function not of the ability of Ohio farm workers but of the size of Ohio farms; as will be discussed in a later section, the average farm in Ohio has less than half the acreage of the average farm nationwide. The smaller scale of Ohio farms makes the highest levels of technology less cost-effective than on larger farms elsewhere.

Exhibit 4
Farm Worker Productivity (GDP per Worker), Ohio and U.S., 1997-2012



Source: Calculated from Regional Economic Accounts, U.S. Bureau of Economic Analysis.

The smaller size of Ohio farms is echoed in smaller average receipts from agricultural products per farm – not including government payments. These were $93,200 in Ohio in 2007 versus $134,807 nationally, according to the Census of Agriculture. But as Exhibit 5 on the next page reveals, the distribution of farms by level of receipts is not markedly different until receipts reach the highest levels. The likely explanation is that the receipts of the very largest farms are pulling the U.S. average up, and that the receipts of the typical Ohio farm (the median) probably differs much less from the receipts of the typical farm nationwide. But it is clear that the vast majority of farms meet the usual definition of a small business.

Exhibit 5
Distribution of Farms by Value of Agricultural Products Sold, 2007

Value of sales	Ohio		U.S.
	Number	Percentage	Percentage
Total	75,861	100.0%	100.0%
Less than $1,000	14,119	18.6%	22.7%
$1,000 - $2,499	9,845	13.0%	12.3%
$2,500 - $4,999	8,930	11.8%	11.2%
$5,000 - $9,999	8,720	11.5%	11.6%
$10,000 - $24,999	9,507	12.5%	12.4%
$25,000 - $49,999	6,678	8.8%	7.4%
$50,000 - $99,999	5,700	7.5%	5.9%
$100,000 - $249,999	5,782	7.6%	6.8%
$250,000 - $499,999	3,397	4.5%	4.4%
$500,000 - $999,999	2,042	2.7%	2.9%
$1,000,000 - $2,499,999	898	1.2%	1.9%
$2,500,000 or more	243	0.3%	0.7%

Source: Census of Agriculture, U.S. Department of Agriculture, 2007.

Farmland

The Ohio Farm Bureau Federation estimates that farms occupied 13.68 million acres of land in Ohio in 2010 – 52.2 percent of the state's total land area. Approximately 85 percent of this total was in cropland, with the remaining 15 percent in pasture. However, farmland was 14.738 million acres (56.2 percent) in 1997, meaning that more than one million acres of Ohio farmland were converted to other uses during those 13 years. Meanwhile, the number of farms declined by 4,000 – from 78,700 to 74,700.

Exhibit 6 on the next page presents the 17 Ohio counties in which farmland occupies more than 80 percent of the county's total land area. These counties are primarily in the northwestern quadrant of the state; however, two counties – Madison and Pickaway – are adjacent to Franklin County and are part of the Columbus MSA. All 88 counties have at least some farming activity, although in Cuyahoga farmland occupies only 3,000 acres (1.0 percent). However, farmland covers 7.7 percent of Hamilton County's land area, and 16.2 percent of land area in Franklin County.

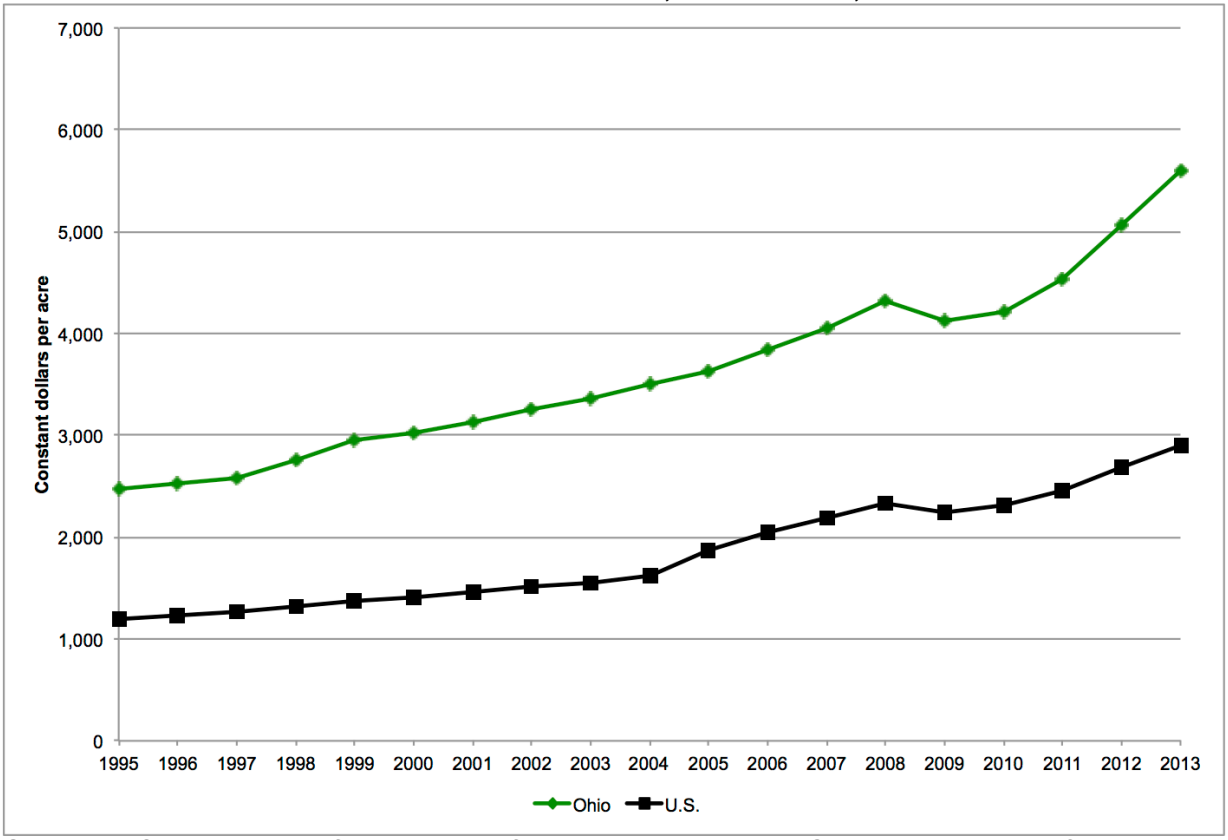
The price of farmland has increased steadily over the past 18 years – increases of 127 percent after inflation in Ohio and 143 percent nationally since 1995. Further, average prices for farmland in Ohio have consistently been about twice as high as the national average, as shown in Exhibit 7. This suggests that Ohio farmland is more productive than average – hence the finding in Exhibit 5 that smaller farms generate about the same distribution of income as farms elsewhere.

Exhibit 6
Ohio Counties with More than 80 Percent of Land Area in Farms, 2010

County	2010			1997		
	No of farms	Land area	Percentage	No of farms	Land area	Percentage
Mercer	1,290	293,000	98.8%	1,330	265,191	89.4%
Paulding	760	258,000	96.8%	593	217,202	81.5%
Putnam	1,310	295,000	95.3%	1,448	297,921	96.2%
Van Wert	690	243,000	92.6%	762	242,047	92.2%
Darke	1,770	351,000	91.4%	1,881	334,705	87.2%
Pickaway	820	289,000	89.9%	797	277,738	86.4%
Defiance	1,150	232,000	88.2%	965	193,212	73.4%
Wyandot	630	222,000	85.5%	661	210,570	81.1%
Preble	1,170	232,000	85.3%	1,123	202,746	74.6%
Henry	870	227,000	85.2%	922	247,101	92.7%
Hardin	840	256,000	85.1%	912	248,941	82.7%
Fayette	600	220,000	84.5%	573	245,994	94.5%
Crawford	670	215,000	83.5%	780	229,906	89.3%
Madison	710	248,000	83.3%	741	269,451	90.5%
Shelby	1,050	217,000	82.8%	1,087	204,049	77.9%
Auglaize	1,050	209,000	81.4%	1,092	214,198	83.4%
Clinton	790	212,000	80.6%	848	225,714	85.8%

Source: Ohio Farm Bureau Federation estimates; Census of Agriculture, U.S. Department of Agriculture, 1997.

Exhibit 7
Constant-Dollar Price of Farmland, Ohio and U.S., 1995-2013



Source: U.S. Department of Agriculture; inflation adjustment by the GDP Implicit Price Deflator.

Regional Employment Levels and Trends

The regions mapped in Exhibit 8 should be familiar to regular readers of this column; they have been repeatedly used to analyze various sub-state economic trends. These regions include each of Ohio's six largest Metropolitan Statistical Areas (MSAs) and seven other regions composed of the remaining 60 counties including Ohio's smaller MSAs and rural areas. These regions combine roughly similar counties based on employment concentrations primarily in farming and manufacturing.

Exhibit 8
Ohio Regions

Northwest Toledo MSA West North Central Cleveland MSA Akron MSA
Northeast West Columbus MSA East North Central Dayton MSA
Cincinnati MSA South Southeast

Exhibit 9 summarizes the farm employment of each of these regions. Reported are the totals of proprietors (owners and/or operators), non-operator employees, the sum of these two categories, and the share of total employment of the region accounted for by farm employment. The following column presents the *location quotient* of farm employment. This is the percentage of total local employment in farming divided by the percentage of total national employment in farming. Thus, a location quotient greater than 1.0 indicates an employment concentration greater than average. The final column reports the 2001-2011 percentage growth for each area.

Exhibit 9
Agricultural Employment, Concentration, and Ten-Year Change, Ohio Regions, 2011

Region	Proprietors	Employees	Total farm employmt.	% of region total	Location quotient	Change, 2001-11
Northeast	6,540	7,765	14,305	2.4%	0.93	-22.7%
Southeast	5,681	6,128	11,809	6.5%	2.55	-20.2%
South	8,501	9,133	17,634	8.4%	3.26	-15.7%
West	8,876	10,846	19,722	5.8%	2.28	-21.3%
Northwest	4,934	5,602	10,536	11.2%	4.39	-16.2%
West North Central	5,060	6,162	11,222	4.3%	1.69	-23.9%
East North Central	5,760	6,991	12,751	8.0%	3.14	-21.1%
Non-MSA Total	**45,352**	**52,627**	**97,979**	**5.3%**	**2.08**	**-20.2%**
Akron MSA	994	1,256	2,250	0.6%	0.22	-21.8%
Cincinnati MSA*	3,838	4,476	8,314	0.8%	0.33	-23.0%
Cleveland MSA	2,521	4,627	7,148	0.6%	0.22	-26.7%
Columbus MSA	5,896	7,057	12,953	1.1%	0.43	-23.9%
Dayton MSA	3,227	3,811	7,038	1.5%	0.59	-19.4%
Toledo MSA	2,389	3,081	5,470	1.5%	0.57	-19.7%
MSA Total	**18,865**	**24,308**	**43,173**	**0.9%**	**0.36**	**-22.9%**
Ohio	**64,217**	**76,935**	**141,152**	**2.2%**	**0.84**	**-21.0%**

*Ohio counties only.
Source: Regional Economic Accounts, U.S. Bureau of Economic Analysis.

All non-MSA regions have location quotients significantly greater than 1.0 except the Northeast. This region is relatively more urbanized, including the Canton, Steubenville, and Youngstown-Warren MSAs. The Northwest enjoys the highest concentration of farming employment in the state; the only one of the region's six counties with less than 80 percent of land area in farms is Williams (which is 79.1 percent farmland). The Columbus MSA has the highest farming employment concentration of the three largest MSAs, with total employment comparable to the that in the non-MSA regions. Madison and Pickaway Counties each have more than 80 percent of their land area in farms, while farmland is 74.1 percent of Union County's land area. As revealed in the final column, employment losses are relatively consistent among regions, with the Northwest and South somewhat lass than average.