

Summary Measures of the Economic Importance of Agri-food Industries in Madison County, Iowa

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This summary report provides county-level statistics for Madison County, Iowa as a supplement to *The Economic Importance of Agri-food Industries in Iowa*¹ (hereafter referred to as the “state report”). Throughout this summary, local data will be presented that reflects the data provided in the state report. Brief descriptions of the data will be provided along with references back to the state report for more detailed explanations of the data and its use.

Table 1 shows that Madison County had 990 farms in 2002. These farms averaged 307 acres apiece compared to an average of 350 acres per farm, statewide. Nationwide, farms are generally larger than in Iowa. The average US farm included 441 acres in 2002. The estimated market value of land and buildings per farm in Madison County was \$584,025 in 2002, compared to \$808,152 for Iowa and \$604,403, nationwide. In 2002, Madison County farms marketed an average of \$71,215 worth of farm products according to the US Census of Agriculture.

Table 1. Madison County Farm Statistics from the US Census of Agriculture

	Madison County		Iowa		United States	
	2002	1997	2002	1997	2002	1997
Number of farms	990	1,064	90,655	96,705	2,128,982	2,215,876
Land in farms (acres)	304,333	331,350	31,729,490	32,313,119	938,279,056	954,752,502
Average farm size (acres)	307	311	350	334	441	431
Market value, per farm, of						
Land and buildings (\$)	520,520	398,456	707,730	559,678	537,833	416,007
Machinery and equipment (\$)	63,505	50,845	100,422	79,607	66,570	53,861
Farm products sold (\$)	71,215	69,812	135,388	125,766	94,245	90,880

Table 2 shows employment data for Madison County and the state of Iowa compiled within a framework used by the US Department of Agriculture (USDA) to identify a broad range of farm and farm-related employment. These numbers are a reduced set of the statistics provided as Table 4 in the state report. The USDA compiles these employment numbers annually for each of the 50 states². For this summary, we have used the USDA classification system and data from the US Bureau of Economic Analysis and the Iowa Department of Workforce Development to generate similar results for Madison County. Detail is restricted in this summary, due to the smaller employment base and privacy issues at the county level.

¹ Mark Imerman, David Swenson, Liesl Eathington, Daniel Otto. Iowa State University Department of Economics. 2005.

² The USDA's definition of farm-related industries includes all food-based businesses through retailing and restaurants. Substantial portions of packaging manufacture, of gravel and lime extraction, and apparel manufacturing are also included. A discussion of the implications of the breadth of this framework is included on pages 6-9 of the state report.

Table 2. USDA-style Compilation of 2002 Farm and Farm-related Employment (Jobs)

	Madison County			Iowa	
	Jobs	As a percent of County total	State Category	Jobs	% of state total
Farm and closely-related	1,441	21.60	0.71	201,967	10.57
Peripherally-related	366	5.49	0.19	191,669	10.04
Total farm and farm-related	1,807	27.09	0.46	393,636	20.61
Total employment	6,670	100.00	0.35	1,909,934	100.00

Data derived from the US Bureau of Economic Analysis and the Iowa Department of Workforce Development within a framework obtained from the USDA.

Tables 3 and 4 estimate the value of a more restricted definition of the agri-food industries for Madison County. These tables are consistent with Tables 5 and 6 in the state report. Estimates included in these tables limit the agri-food industries to ag production (traditional farm production and nonfarm production facilities), food and other primary farm commodity processing, and ag input manufacturing (machinery, ag chemicals, and fertilizer)³.

Table 3 provides value estimates for an industry-only aggregation of the economic activity that takes place within Madison County's borders. Output is the value of total in-county production for each industry in 2002. Value-added is the value that was added to Output by each industry's in-county production process. The difference between Output and Value-added is the value of purchased inputs that go into the production process. For individual industries, these inputs may be sourced from out-of-county or from within the county. Value-added represents the value of Output minus the value of purchased inputs. Table 3 also provides an estimate of jobs⁴ and labor income (compensation for employees and proprietors) within the agri-food industries in Madison County.

Table 3 shows that, in 2002, the total output value of Madison County's agricultural production industry was \$73.153 million. \$26.960 million of this output (36.85 percent of the total output value) was the value added to the output by Madison County's ag production activity (ag production's value added). The remainder came from purchased inputs into the process (from either in-county or out-of-county sources). 50.06 percent of this value added, or \$13.496 million, was paid out as compensation to the 1,046 production agriculture jobs in Madison County.

³ Estimates were generated through a process of recompiling and analyzing statistics derived from the IMPLAN database system maintained by MIG, Inc. A detailed discussion of the estimates presented here, the differences between the two tables, and how they can be interpreted is provided in pages 9 through 17 of the state report.

⁴ Jobs do not refer to the number of people working or to full-time-equivalent employment. Jobs can be full or part time. A single individual can hold multiple jobs. In short, jobs cannot be looked upon as interchangeable or comparable across industries, businesses, or location. Comparisons of wages and compensation are more appropriate in an economic value context.

Table 3. Industry-only Estimation Based on IMPLAN and Census Data

Madison County			Labor	Value-Added	
Agricultural Production	Output*	Jobs	Income*	Value*	Pct. Of Tot.
Oilseeds	13.423	200	4.424	7.217	3.47
Grain	17.889	401	4.331	8.101	3.90
Other Crops	10.169	73	2.578	6.083	2.93
Cattle	14.506	153	0.179	1.021	0.49
Poultry	10.912	33	1.457	3.562	1.71
Hogs and Pigs	4.085	143	0.310	0.634	0.31
Other Ag Production	2.169	43	0.217	0.342	0.16
Sum of Ag Production	73.153	1,046	13.496	26.960	12.97
Primary Food Processing					
Crop	3.282	3	0.091	0.171	0.08
Dairy	0.000	0	0.000	0.000	0.00
Meat	2.211	6	0.170	0.203	0.10
Sum of Primary Food Proc.	5.493	9	0.261	0.374	0.18
Other Food/Ag Processing					
Animal and Pet Foods	0.000	0	0.000	0.000	0.00
Other Food Processing	0.182	3	0.044	0.077	0.04
Sum of Other Ag Proc.	0.182	3	0.044	0.077	0.04
Ag Input Manufacturing					
Ag Chemical and Fertilizer	0.000	0	0.000	0.000	0.00
Farm Machinery	0.000	0	0.000	0.000	0.00
Sum of Ag Input Mfg.	0.000	0	0.000	0.000	0.00
Sum of All Agri-food Ind.	78.828	1,058	13.801	27.411	13.18
NonAg Industries	305.635	4,993	115.103	180.500	86.82
Totals	384.463	6,051	128.904	207.911	100.00

* Numbers represent millions of dollars

If we add food and other ag processing and ag input manufacturing to agricultural production, the value of Madison County's agri-food industry output was \$78.828 million, or 20.50 percent of Madison County's total industrial production. Of this, \$27.411 million (34.77 percent) was value added within these industries in Madison County. \$13.801 million of this value added was paid out as wages and salaries to the 1,058 agri-food industry jobs in the county.

Overall, Table 3 shows that Madison County's agri-food industries directly accounted for 20.50 percent of the county's total output, 13.18 percent of total value added, 10.71 percent of labor income, and 17.49 percent of the county's jobs⁵.

⁵ It is unusual but possible for counties to have negative output, value-added, and labor income values in some categories, resulting in negative percents of totals. Where this happens, it is generally due to write-downs of assets and proprietor interests due to firm closings or bankruptcies, market situations where output must be sold at less than production costs, or reverse flows of incomes, pensions, or benefits.

Table 4. Industry-of-output aggregation including local inputs

Madison County	Output*	Income*	Value Added*	Value Added As a Percent of Nonhousehold	
				Total V.A.	Demand
Agricultural Production					
Oilseeds	16.509	6.752	9.322	4.48	6.15
Grain	20.145	6.866	9.902	4.76	6.54
Other Crops	7.098	2.807	4.323	2.08	2.85
Cattle	18.947	2.697	4.545	2.19	3.00
Poultry	13.094	3.310	4.997	2.40	3.30
Hogs and Pigs	5.212	0.952	1.497	0.72	0.99
Other Ag Production	2.437	0.410	0.585	0.28	0.39
Sum of Ag Production	83.441	23.793	35.171	16.92	23.21
Primary Food Processing					
Crop	3.711	0.359	0.526	0.25	0.35
Dairy	0.000	0.000	0.000	0.00	0.00
Meat	1.732	0.219	0.338	0.16	0.22
Sum of Primary Food Proc.	5.444	0.578	0.864	0.42	0.57
Other Food/Ag Processing					
Animal and Pet Foods	0.000	0.000	0.000	0.00	0.00
Other Food Processing	0.031	0.010	0.014	0.01	0.01
Sum of Other Ag Proc.	0.031	0.010	0.014	0.01	0.01
Ag Input Manufacturing					
Ag Chemical and Fertilizer	0.000	0.000	0.000	0.00	0.00
Farm Machinery	0.000	0.000	0.000	0.00	0.00
Sum of Ag Input Mfg.	0.000	0.000	0.000	0.00	0.00
Sum of All Agri-food Ind.	88.915	24.381	36.049	17.34	23.79
NonAg Industries	212.221	86.269	115.454	55.53	76.21
Household Consumption	83.327	273.509	56.408	27.13	37.23
Totals	384.463	384.159	207.911	100.00	137.23

* Numbers represent millions of dollars

Table 4 shows a different aggregation of the county's industrial output. Table 4 is derived from the same data as is Table 3, and total values for Table 4 are identical to total values for Table 3. The difference is the point at which values were counted. In Table 3, values were counted in each industry where productive activity took place. In Table 4, values were counted at the industry that made the final export (out-of-county) sale of goods and services produced⁶. This is final demand analysis. It helps illustrate the magnitude of inter-industrial linkages and the value of those linkages to local income generation from export sales⁷.

⁶ Goods not sold out of county were counted under the heading of "Household Consumption" and not in industry totals in Table 4.

⁷ The point at which final products are sold out-of-county was chosen as an endpoint because it coincides with the point at which industrial output brings revenue into the county. This point also avoids problems

Table 4 reallocates all industrial activity in the county to the sectors producing goods for sale beyond the county's borders (export sale). This means that if there is a local meat packer that purchases all of its live cattle from local farmers, the output value, value-added, and personal income generated in the production of those cattle is aggregated up to the meat packing industry. Similarly, the value of locally produced farm machinery purchased for use on local farms is not included in the aggregation under farm machinery, but is subsumed under agricultural production (and partially subsumed, again, into food processing if the farm output that it was used to produce passes through local food processors on its journey to final sale outside of the county). In a nutshell, the output, value-added, and income estimates in Table 4 estimate the total share of the local economic activity utilized to generate final output from the agri-food sectors.

Under this aggregation, the total exported output value of locally produced goods and services supporting Madison County's agricultural production industry was \$83.441 million. \$35.171 million of this output (42.15 percent of the total output value) was the value added to the output by economic activity within Madison County (value added). The remainder came from inputs purchased from out-of-county sources. 67.65 percent of this value added, or \$23.793 million, was paid out as personal income to residents of Madison County that were involved (as workers, owners, investors, etc) in these activities.

If we add food and other ag processing and ag input manufacturing to agricultural production, the export value of goods and services supporting Madison County's agri-food industry output was \$88.915 million, or 23.13 percent of Madison County's total industrial production. Of this, \$36.049 million (40.54 percent) was value added within these industries in Madison County. \$24.381 million of this value added was paid out as personal income.

Overall, Table 4 shows that exports from Madison County's agri-food industries accounted for 23.13 percent of the county's total output, 17.34 percent of total value added, and 6.35 percent of the county's personal income.

Table 5. Crop Statistics From the U.S. Census of Agriculture

	Madison County		Iowa	
	2002	1997	2002	1997
Value of All Farm Products Sold*	70,502	74,280	12,273,634	12,162,165
Value of Crops Sold*	33,327	36,431	6,071,272	6,381,676
Total Cropland Harvested (acres)	154,993	167,002	23,994,343	24,008,826
Corn for grain	61,365	70,237	11,761,392	11,930,542
Corn for silage and green-chop	1,838	2,062	247,269	244,913
Soybeans	62,981	68,096	10,418,621	10,258,681
Oats	789	1,274	143,513	214,485
Harvested forage crops	28,903	(NA)	1,533,027	(NA)
Bushels harvested				
Corn	9,157,276	8,427,410	1,851,276,224	1,581,093,092
Soybeans	2,895,644	2,797,025	487,380,897	459,309,682
Oats	53,815	71,218	10,761,952	14,451,930

* Values are in \$1,000s

that would accompany trying to separate local household consumption between that which consumes local food products and that which consumes food products imported from outside the county.

Table 5 shows Madison County crop inventories and sales for 1997 and 2002. State statistics are included for comparison. Table 6 provides similar information for Madison County livestock. Data in both tables comes from the US Census of Agriculture. In both tables “(NA)” entries denote categories where data was not collected or compiled, and “(D)” entries designate that data was collected but results were suppressed to comply with personal disclosure restrictions.

Table 6. Livestock Statistics From the U.S. Census of Agriculture

	Madison County		Iowa	
	2002	1997	2002	1997
Value of All Farm Products Sold	70,502	74,280	12,273,634	12,162,165
Value of Livestock and Livestock Products Sold*	37,175	37,849	6,202,362	5,780,489
Hogs and Pigs				
Total inventory	30,581	39,894	15,486,531	14,513,319
Inventory of breeding stock	1,900	8,029	1,145,323	1,354,166
Number sold	109,760	86,306	41,232,492	27,340,921
Value of sales*	(D)	9,006	3,078,455	3,012,764
Cattle and Calves				
Total inventory	40,455	45,980	3,535,945	3,717,394
Beef cows	20,926	22,359	987,670	1,051,178
Milk cows	13	12	206,965	222,090
Number sold	22,946	24,204	2,929,704	2,936,978
Value of sales*	14,008	12,254	2,119,935	1,886,416
Value of Dairy Products Sold*	(D)	(D)	442,431	407,897
Poultry and Poultry Products				
Value of sales*	(D)	(D)	511,949	414,587
Inventory of layers 20 weeks and older	(D)	(D)	38,650,210	21,514,768
Broiler and meat-type chicken inventory	130	612	1,730,091	1,023,349
Broiler and meat-type chickens sold	(D)	(D)	9,558,127	6,919,963
Turkey inventory	26	72	3,681,862	2,552,845
Turkeys sold	(D)	(D)	9,145,415	7,279,822
Sheep and Goats and Related Products				
Value of sales	144	(NA)	23,366	(NA)
Inventory of sheep and lambs	2,471	2,167	249,908	272,913
Number of sheep and lambs sold	1,789	1,884	257,130	326,868

* Values are in \$1,000s

The first three data columns of Table 7 show aggregated annual earnings in thousands of dollars from farm employment, nonfarm employment, and totals employment in Madison County from 1990 through 2003. The values are not adjusted for inflation. Note that nonfarm earnings steadily rise throughout the period. Total earnings rise, but with somewhat more variation. Farm earnings swing significantly from year-to-year. This is typical of earnings in economies with a substantial ag production sector.

The final three data columns of Table 7 show the data again. In Table 7, however, the data is differenced year-by-year. Entries for 1991, for example, are the difference between, change from, 1990 to 1991. Positive numbers denote unadjusted growth. Negative numbers denote unadjusted decline. This representation shows that nonfarm earnings tend to be growing over time, causing total earnings to trend upward over time. The variability in this growth, however, is strongly associated with the variability of farm earnings. This is due to the weather and market factors that make production agriculture returns highly variable (which is also true of many basic mining industries).

While ag production's growth in most areas is limited by the availability of suitable land, its variability has a substantial effect upon rural areas. Even in urbanized areas, the difference between a good earnings year and a bad earnings year is often heavily influenced by conditions affecting agricultural production and marketing.

A more detailed state-level discussion and illustrations are included in the state report on pages 22 through 24.

Table 7. Annual Earnings and Annual Earnings Changes

Year	Annual County Earnings by Source			Annual Changes in County Earnings		
	Farm	Nonfarm	Total	Farm	Nonfarm	Total
1990	9,369	65,394	74,763	(NA)	(NA)	(NA)
1991	7,716	66,375	74,091	-1,653	981	-672
1992	10,840	68,735	79,575	3,124	2,360	5,484
1993	-3,452	76,401	72,949	-14,292	7,666	-6,626
1994	9,857	84,460	94,317	13,309	8,059	21,368
1995	-3,220	89,233	86,013	-13,077	4,773	-8,304
1996	10,380	96,460	106,840	13,600	7,227	20,827
1997	10,847	102,892	113,739	467	6,432	6,899
1998	8,181	110,303	118,484	-2,666	7,411	4,745
1999	3,775	118,865	122,640	-4,406	8,562	4,156
2000	3,581	121,013	124,594	-194	2,148	1,954
2001	3,531	138,323	141,854	-50	17,310	17,260
2002	6,577	146,031	152,608	3,046	7,708	10,754
2003	3,273	152,144	155,417	-3,304	6,113	2,809

Data from the US Bureau of Economic Analysis